Ontario

Ontario Geological Survey
Open File Report 6080

Report of Activities, 2001
Resident Geologist Program

Thunder Bay North Regional
Resident Geologist Report:
Thunder Bay North District

2002

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ONTARIO GEOLOGICAL SURVEY

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Report of Activities, 2001
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Thunder Bay North Regional Resident Geologist Report:
Thunder Bay North District

by

J.K. Mason, G.D. White, J.F. Scott, M.S. O'Brien and C. Komar

2002

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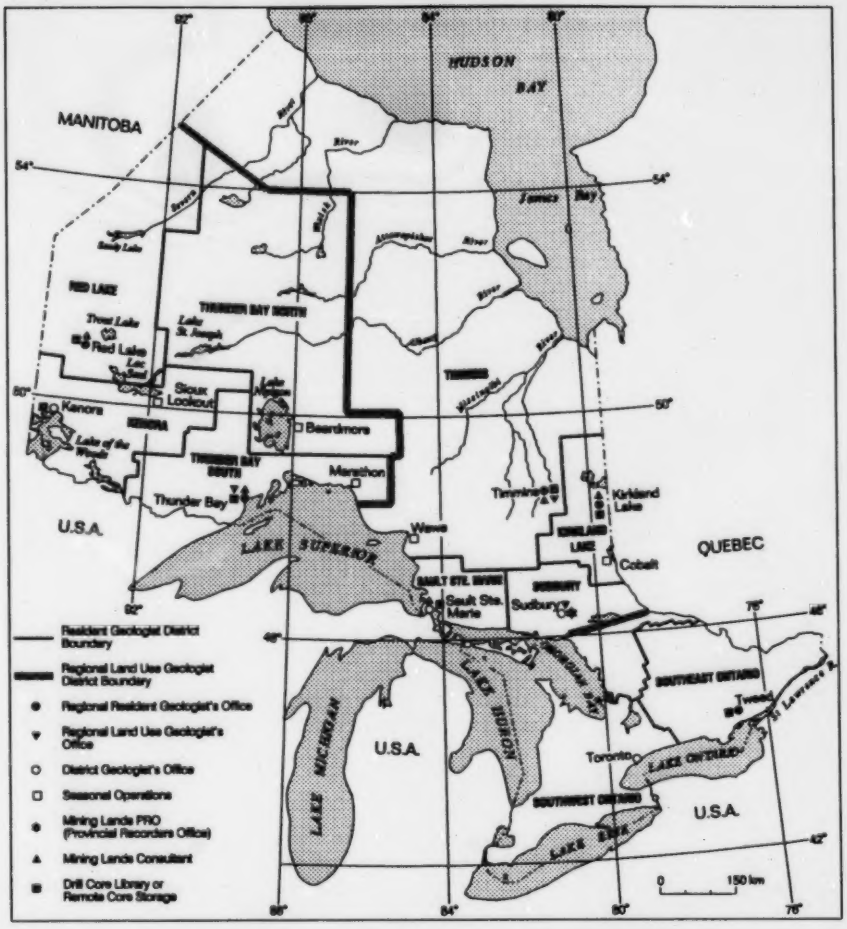

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Ontario

Ontario Geological Survey
Resident Geologist Program

Thunder Bay North Regional Resident Geologist (Thunder Bay North District)—2001

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2002

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THUNDER BAY NORTH DISTRICT—2001

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INTRODUCTION

The Thunder Bay North District was expanded in 2000 to include the northern portion of the former Sioux Lookout District. The southern portion of the former Sioux Lookout District was incorporated into the Kenora District.

The communities of Pickle Lake, Osnaburgh House, Weagamow Lake, Big Trout Lake, Beardmore, Jellicoe, Longlac, Geraldton, Macdiarmid, Nakina, Armstrong, Fort Hope, Kasabonika, Lansdowne House, Summer Beaver and Webequie are situated within the district.

MINING ACTIVITY

The **Musselwhite Mine**, owned by Placer Dome North America Ltd. and TVX–Normandy Americas, is located approximately 126 km north of Pickle Lake. Access to the mine site is by means of an all-weather airstrip on site or a 43 km, all-weather gravel road connecting the mine site to the northern extension of Highway 599. The mine employs about 300 persons.

Gold at the Musselwhite Mine occurs principally in a sulphidized (pyrrhotite), garnet-amphibole-chert-grunerite-magnetite iron formation. The major ore zones occur in shallow-plunging, antiformal fold closures of minor folds within a large, complex fold structure. Sulphidization and quartz flooding occur along a well-developed, axial planar cleavage in the fold hinges. Access to the ore is by means of a ramp. A conveyor system is under construction designed to haul ore from the deeper levels of the mine.

In 2001, the mine produced 232 988 ounces of gold. This was extracted from 1 290 226 tonnes of ore. From 1997 to 2001 (5 years), the Musselwhite Mine has produced 1 034 108 ounces of gold at a grade of 5.79 g/t gold (95.07% recovery) (*Inside Musselwhite Mine* newsletter, Volume 5, Issue 3, January 23, 2002).

> Exploration of the property continued with focus on extensions to the Esker/Island zone, review of the West Anticline Deposits and advancement of numerous other targets at the property. A total of 432,000 ounces were added to the mineral resource base. Major construction at the mine, which is designed to increase production throughout from 3650 tonnes/day to 4000 tonnes/day progressed throughout 2001 and is scheduled for completion mid 2002.
>
> A new Musselwhite Mine agreement was successfully negotiated with the local First Nation communities, this agreement allows the mine 'unfettered business' on the mine property for the life of the mine. The Windigo and Shibogama First Nation Councils, and specifically the Cat Lake FN, North Caribou FN, Kingfisher FN and Wunnumin FN now partake in a revenue sharing agreement. Employee targets of First Nations at the mine has increased to 30% of the total workforce and continued use of FN business opportunities to supply goods and services to the mine also form part of this agreement.
>
> (Andrew Cheatle, Placer Dome North America Ltd., personal communication, 2002).

EXPLORATION ACTIVITY

As of December 31, 2001, there were 8204 active claims, totalling 48 746 claim units, in the Thunder Bay Mining Division (comprising both the Thunder Bay South and Thunder Bay North districts). There were 1341 claims, totalling 14 527 claim units, recorded in the division in 2001.

Fifty-five exploration programs were undertaken in 2001.

Rare Metal Pegmatites

The Superior Province has high potential for tantalum deposits. Exploration areas for tantalum-bearing, rare-element pegmatite deposits include subprovince boundary zones that contain peraluminous, pegmatitic granite plutons with chemically evolved bulk chemistry and mineralogy (Breaks et al. 2001). Exploration targets can also include rare element-enriched granite, alkaline plutonic complexes (e.g., Coldwell Complex) and carbonatites (e.g., Chipman Lake Complex).

Rare-element pegmatite deposits at the Wabigoon–English River Subprovince boundary have been targeted, specifically north of Lake Nipigon. Junior companies active in the Lake Nipigon pegmatite field include: Linear Resources Inc., Murgor Resources Inc., Platinova A/S and Northern Hemisphere Development.

Golden Nugget Exploration Inc., **Platinova A/S** and **Metalore Resources Limited** are actively exploring in the Georgia–Barbara lakes pegmatite field, located in the Quetico Subprovince, northeast of Nipigon.

Avalon Ventures Ltd. and **Global Canada Company** completed a fourth phase of drilling on the Lilypad Lakes Tantalum Project, Uchi Subprovince (west of Fort Hope). Key results from a previously completed drill program include a 22 m section averaging 0.38% Ta_2O_5 and 2.123% Cs_2O from the Rubellite Dike, and a 10 m section averaging 0.40% Ta_2O_5 and 2.892% Cs_2O in the Pollucite Dike system. All 9 drill holes intersected significant tantalum mineralization in the fourth phase of drilling (*Canada Stockwatch*, April 30, 2001, p.3).

Linear Resources Inc. released results from recent trenching and channel sampling at 2 zones on its Seymour Lake property, located just north of Lake Nipigon and east of Armstrong (*see* "Property Examinations", this report). Results from the North Aubry zone included values up to 2.49% Ta_2O_5 over 4 m. Minerals contained within this 62 m wide pegmatite dike include quartz, potassium feldspar, spodumene, apatite, beryl and tantalite. Preliminary trenching at the South Aubry zone indicated that the pegmatite dikes are at least 50 m wide, have a similar mineralogy to the North Aubry zone and returned initial values up to 0.29% Ta_2O_5 over 1 m intervals. Fractionation of the dike, accompanied by rare-element enrichment, may be increasing to the southeast. Values up to 1.34% Li, 1080 ppm Be, 648 ppm Cs and 3130 ppm Rb were returned from sampling in this direction. Both the North and South Aubry zones remain open along strike to the north and south (Company Website Release, St. John's, Newfoundland, July 16, 2001; http://www.linearresources.com).

Berland Resources Ltd. has received exploration results from the Crescent Lake property (north of Lake Nipigon), located 10 km east of Crescent Lake. Nine large angular pegmatite "floats" were sampled. Values up to 0.035% Ta_2O_5 were obtained, as were elevated rubidium and cesium values. The bedrock source is thought to be proximal (*Canada Stockwatch*, November 8, 2001).

Platinum Group Elements (PGE)

Aurora Platinum Corporation continues to evaluate a "reef-type", layered gabbro complex, 30 km north of Lansdowne House in the Sachigo Subprovince. Diamond drilling, which will include testing 15 significant airborne conductive zones, has previously intersected narrow zones of massive sulphides within 20 to 50 m wide zones of net-textured sulphides (*CCN Newswire*, 2001-08-04) and will continue to test copper-nickel-PGE mineralization in the mafic complex. A total of 5000 m will be initially drilled (ibid.).

PGM Ventures Corporation is active on two fronts in the Thunder Bay North District:

(1) The Springer–Lavoie lakes project is adjacent to Aurora Platinum Corporation's Lansdowne project. Exploration in the fall of 2001 totalled $400 000 on a property that hosts a reserve of 14.6 million t grading 0.58% copper and 0.37% nickel and as yet unknown PGE values, hosted in a layered anorthositic gabbro intrusion. Proceeds from a current flow-through offering will be used to fund this exploration work, which is a requirement of its 50% joint-venture agreement with Spider Resources Inc.

(2) The Thierry Mine project is located at Pickle Lake in the central Uchi Subprovince. Exploration in 2001 was initiated with a geological mapping and sampling program conducted by Curtis and Associates Inc. Grab samples assayed up to 9.93 g/t platinum + palladium. PGE mineralization is associated with remobilized copper-nickel sulphides (PGM Ventures Corporation, Press Release, August 23, 2001) in an ultramafic assemblage. The Thierry Mine produced 113.6 million pounds of copper, 27.7 million pounds of nickel, 17 500 ounces of platinum and 47 000 ounces of palladium, before closing in 1982. Exploration in the 1970s and 1980s identified three additional satellite magmatic deposits (Kapkichi deposits) on the property (*Canada Stockwatch*, June 8, 2001, p.31 and 32). A reserve of 7 million t, grading 1.88% copper and 0.23% nickel, exists.

East West Resource Corporation conducted an extensive resampling program of diamond drill core and a Mobile Metal Ion (MMI) geochemical sampling program at the Norton Lake property, 60 km northeast of Fort Hope. The property consists of 203 claim units and is located in the East Uchi Subprovince. PGE mineralization is associated with an 8 m wide band of massive pyrrhotite-pyrite-chalcopyrite in a volcanic-gabbro synform. Reassaying drill core returned values of 3.1 g/t palladium over 7 m, 4.38 g/t platinum over 2.5 m, and up to 2.4 pounds Co per tonne (East West Resource Corporation, Press Release, September 6, 2001). A resource of 944 500 tonnes, grading 0.72% nickel and 0.56% copper, was outlined in 1981, with 20 drill holes by Wasabi Resources Ltd.

Valerie Gold Resources Ltd. optioned 186 claim units covering a new PGE discovery located north of Armstrong. The property vendors are R. Koivisto, Elgin Lake Mines Limited, K. Kukkee and R. Tweedie. The vendors staked Anomaly #5, identified in Open File Report (OFR) 6027, *Armstrong–Lake Nipigon Area Lake Sediment Survey: Operation Treasure Hunt—Area C*, by the Ontario Geological Survey (2000a) and discovered a new PGE occurrence with a 300 m strike length. Assay values up to 750 ppb platinum + palladium + gold mineralization were associated with fine- to medium-grained gabbro (*Canada Stockwatch*, December 5, 2001).

Spruce Ridge Resources Ltd. optioned the Final Lake PGE property from N. Cox and L. Holt. The property is located 25 km north-northeast of Jellicoe and occurs within a gabbro-pyroxenite intrusive complex (Kresz 1991) 6 km long by 1.6 km wide (*see* "Property Examinations", this report). Power stripping and channel sampling returned select assay values exceeding 1 g/t PGE (Resident Geologist's Files, Thunder Bay North District, Thunder Bay).

Canplats Resources Corporation and Canadian Golden Dragon Resources Ltd. completed a diamond drilling program on the Grand Bay property, on the southwestern shore of Lake Nipigon. The drilling program was designed to test a 3 km long magnetic feature with flanking induced polarization (IP) anomalies and correlative, time-domain electromagnetic conductors. The Grand Bay property covers a Noril'sk-type setting located on the Black Sturgeon fault (*CCN Newswire*, 2001-10-15).

Hunter Dickinson Inc. (with joint-venture partners East West Resource Corporation and Maple Minerals Inc.) completed prospecting, sampling and reconnaissance mapping on the Eva–Kitto ultramafic ring dike complex on the southeastern shore of Lake Nipigon. The ultramafic suite is analogous to picritic rocks found on the Wolf Mountain–Seagull and Disraeli PGE properties in Hele Township.

Landore Resources Inc. completed a total of 4001 m of diamond drilling on the Juneau–Junior lakes PGE property, located northeast of Lake Nipigon in the Wabigoon Subprovince. All drilling was centred on, and north and south of, the B4-7 massive sulphide zone, with sample results ranging up to 1.9% Ni, 0.6% Cu, 0.11% Co, 1088 ppb Pd and 254 ppb Pt. The B4-7 zone hosts 2.2 million t grading 0.87% nickel and 0.59% copper. An additional 5000 m of drilling is planned following geophysical and geochemical surveys (*CCN Newswire*, May 17, 2001). Drill hole LDO-01-20 intersected 4.0 m of 3.618 g/t PGE (*CCN Newswire*, 2001-12-11).

East West Resource Corporation completed an airborne magnetic survey, MEGATEM® survey, and geochemical survey on the Havoc Lake property near English Bay, Lake Nipigon. East West Resource Corporation completed geological mapping on the Pillar property, west of Lake Nipigon.

Gold

Roxmark Mines Ltd. has reopened the Beardmore Mill, on the Northern Empire Mine site in Beardmore. The mill is a 140 to 200 ton per day facility (employing 20 people) available for custom milling and bulk sample analysis. Roxmark Mines is currently milling ore from Roxmark-held properties in the area, including the Sand River Mine and Sturgeon River Mine development muck.

Ontex Resources Limited released an updated resource calculation for the Brookbank gold deposit and related mineralized zones, including the Foxear, Irwin and Cherbourg zones. The property covers 29 000 acres, enclosing 655 claim units straddling the Paint Lake fault northeast of Beardmore. New resource figures are listed below using two different cutoff grades:

BROOKBANK DEPOSIT (TONNAGE/GRADE)	
Indicated (@ 2.0 g/t gold cutoff grade)	1 612 000 tonnes @ 7.0 g/t gold (equivalent to 365 000 contained ounces)
Indicated (@ 3.0 g/t gold cutoff grade)	1 374 000 tonnes @ 7.7 g/t gold (equivalent to 342 000 contained ounces)
Inferred (@ 2.0 g/t gold cutoff grade)	1 463 000 tonnes @ 6.4 g/t gold (equivalent to 299 600 contained ounces)
Inferred (@ 3.0 g/t gold cutoff grade)	1 182 000 tonnes @ 7.2 g/t gold (equivalent to 273 800 contained ounces)

(*BCE Emergis E-News Services*, 2001-03-08)

International Kodiak Resources Inc.–International Taurus Resources Inc. identified a new gold zone north of the south shaft on the Lincoln gold property, near Tashota. Power stripping, sampling, line cutting, geological mapping and an IP survey were completed.

NWT Copper Mines Limited completed prospecting and sampling on the Adair gold prospect, Tashota area.

Norcal Resources Ltd. acquired the Fry Lake property, located 125 km north of Sioux Lookout. Values up to 448.5 g/t gold occur in three quartz vein-hosted zones associated with two east-trending deformation zones (Norcal Resources Ltd., News Release, 2001-07-25).

Volcanogenic Massive Sulphide (VMS)

S. Roach completed detailed mapping and channel sampling of the Wobbegone VMS property in the Metcalfe Lake area, north of Onaman Lake. Previously, VMS alteration, including sodium depletion, was identified in a whole-rock sampling program.

Table 1. Assessment files received in the Thunder Bay North District in 2001.

Abbreviations

AEM ..... Airborne electromagnetic survey
AM ..... Airborne magnetic survey
ARA ..... Airborne radiometric survey
Beep ..... Beep Mat survey
Bulk ..... Bulk sampling
DD ..... Diamond drilling
DDH ..... Diamond drill hole(s)
DGP ..... Down-hole geophysics
GC ..... Geochemical survey
GEM ..... Ground electromagnetic survey
GL ..... Geological Survey
GM ..... Ground magnetic survey
GRA ..... Ground radiometric survey
Grav ..... Gravity survey
HLEM ..... Horizontal loop electromagnetic survey
HM ..... Heavy mineral sampling
IM ..... Industrial mineral testing and marketing
IP ..... Induced polarization survey
Lc ..... Linecutting
Met ..... Metallurgical testing
OD ..... Overburden drilling
ODH ..... Overburden drill hole(s)
PEM ..... Pulse electromagnetic survey
PGM ..... Platinum group metals
Pr ..... Prospecting
RES ..... Resistivity survey
Samp ..... Sampling (other than bulk)
Seismic ..... Seismic survey
SP ..... Self-potential survey
Str ..... Stripping
Tr ..... Trenching
UG ..... Underground exploration/development
VLEM ..... Vertical loop electromagnetic survey
VLFEM ..... Very low frequency electromagnetic survey

Township or Area	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
Alfred Lake and McQuesten Township	Houghton, F.	1998	GEM, GM, Pr, Samp	OP98-116	42E15/SW
Black Sturgeon Bay	Colby Resources Corp.	2001	GM, IP	2.21052	52H07/NW, 52H10/SW
Black Sturgeon Bay, Johnspine & Voltaire lakes	Canplats Resources Corp. (Colby Resources Corp.)	2000	AM, AEM	2.20918	52H11/NE/NW, 52H07/NW, 52H14/SE/SW
Croll and Houck townships	Cote, Robert & Cote, Richard	2000	GM, GEM, Pr, Str	2.20589	42E10/NE/NW, 42E15/SE/SW
Dorothea Township	P. Lassila & Houghton, F.	2000	Pr	2.20935	52H9/NE
Elmhirst Township	Clarke, L., Houghton, F. & Houghton, P.	1999	GM, Pr, Samp	2.21037	42E13/SE
Fort Hope area	Avalon Ventures Ltd.	2000	GC, GL, Grav, Lc, Samp	2.21519	52P09/NW/NE
Grand Bay	Colby Resources Corp., Canplats Resources Corp. (Canadian Golden Dragon Res. Ltd.)	2000	GM, IP, RES	2.20920	52H10/SW, 52H11/SE
Grand Bay and Chief Bay	Colby Resources Corp. (Canadian Golden Dragon Res. Ltd.)	2001	GM, IP, Lc	2.20910	52H11/SE, 52H10/SW
Gzowski Township	NWT Copper Mines Limited, Cox, N. & International Taurus Resources Inc.	2000	Str, Samp	2.20801	42L04/NE, 42L05/SE
Havoc Lake	Corona Gold Corp.	2000	GL	2.20768	52H14/NE

Township or Area	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
Havoc Lake	East West Resources Corp.	2000	GM	2.20914	52H14/NE
Hurst & Felsia lakes	McCullough, A.	1998	GC, GEM, GL, Samp	OP98-047	52P08/SW
Hurst, Felsia & Petawanga lakes	Parent, S.	1998	GC, GL, Samp	OP98-048	52P08/SW/NW
Irwin Township	Metalore Resources Ltd. & Ontex Resources Limited	2000	DD, Samp	2.20825	42E12/NW
Johnspine & Voltaire lakes	Canplats Resources Corp. (Colby Resources Corp.)	2000	AM, AEM, IP, GL	2.20921	52H11/NE, 52H14/SE/SW
Junior Lake area	Inco Ltd.	2001	Pr, Samp	2.21975	42L05/NW
Junior Lake area	Landore Resources Inc. (Brancote Canada Ltd.)	2000	Samp	2.20982	42L05/NW/SW
Klotz Lake	Swereda, M.	1998	Pr, Tr, Samp	OP98-319	42F13/SW
Linklater Lake	Kump, D., Earls, J. & Kump, G.	2000	Pr, Samp	2.21467	52I10/SW
Meader Township	Metalore Resources Ltd.	1999	AM, RES, IP	2.20965	42E13/SW
Metcalfe Lake	Yzerdraat, W.	2000	GL	2.20748	42L04/NE
Nipigon House & Voltaire Lake	Colby Resources Corp.	2001	GEM, IP, Lc	2.20911	52H11/NE
Oboshkegan Township	Cameco Corp.	1999	GC, GL, Pr, Tr, DD, Samp	2.20676	42L04/NE, 42L03/NW
Oboshkegan & Gzowski townships	Kindla, D.	1998	Pr, Samp	OP98-058	42L03/NW
O'Sullivan Lake	Atkins, M. & Maitland, T.	1998	GC, Pr, Samp	OP98-408&-409	42L06/NE
Pifher Township	Daniels, G. & Wahl, R.	1998	Pr, Samp	OP98-305	42E13/SW
Pifher Township & Tyrol Lake	Grant, J.	1998	Pr, Samp	OP98-191	42E13/SW
Pifher Township & Tyrol Lake	Pifher Resources Inc.	1999–2000	GL, IP, RES, DD	2.20905	42E13/SW
Poplar Point	Houghton, F.	1998	GEM, Pr, Samp	OP98-115	52H09/NE
Summers Township	Cote, Robert & Cote, Richard	2000	GL, Pr	2.20878	42E12/NW
Summers Township	Ternowesky, J.	2000	Samp	2.20411	42E12/NW
Toronto Lake	Michon, R.	1998	Pr	OP98-081	42L05/SW
Vincent Township	Maki, N.	2000	Str, Tr, Samp	2.20877	42E12/NE
Voltaire Lake	Canplats Resources Corp.	2001	DD	2.21341	52H11/NE
Voltaire Lake	Pure Gold Resources Inc. & Slam Expl. Ltd.	2000	DD	2.21051	52P09/SE
Voltaire Lake & Nipigon House	Canplats Resources Corp. & Colby Resources Corp.	2001	GEM, GM, Lc	2.21338	52H11/NE, 52H14/SE

Township or Area	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
Voltaire Lake & Nipigon House	Canplats Resources Corp. & Colby Resources Corp.	2001	GEM, GM, Lc	2.21342	52H11/NE
Walters Township	Lassila, P. & Houghton, F.	2000	Pr	2.20934	42E12/NE
Walters Township	Swan, D.	2000	GEM, GM, GL	2.20697	42E12/NE
Walters Township	Swan, D.	2000	GEM, GM, GL	2.20698	42E12/NE
Walters & Irwin townships	St. Anthony Resources Inc., Houghton, F. & Cox, N.	1999	AEM, AM, ARA	2.20906	42E12/NE/NW
Wesleyan Lake	Parker, D.	2000	Tr	2.20710	52O04/NE

Table 2. Exploration activity in the Thunder Bay North District in 2001 (keyed to Figures 1, 2 and 3).

Abbreviations

AEM ..... Airborne electromagnetic survey
AM ..... Airborne magnetic survey
ARA ..... Airborne radiometric survey
Beep ..... Beep Mat survey
Bulk ..... Bulk sampling
DD ..... Diamond drilling
DDH ..... Diamond drill hole(s)
DGP ..... Down-hole geophysics
GC ..... Geochemical survey
GEM ..... Ground electromagnetic survey
GL ..... Geological Survey
GM ..... Ground magnetic survey
GRA ..... Ground radiometric survey
Grav ..... Gravity survey
HLEM ..... Horizontal loop electromagnetic survey
HM ..... Heavy mineral sampling
IM ..... Industrial mineral testing and marketing
IP ..... Induced polarization survey
Lc ..... Linecutting
Met ..... Metallurgical testing
OD ..... Overburden drilling
ODH ..... Overburden drill hole(s)
PEM ..... Pulse electromagnetic survey
PGM ..... Platinum group metals
Pr ..... Prospecting
RES ..... Resistivity survey
Samp ..... Sampling (other than bulk)
Seismic ..... Seismic survey
SP ..... Self-potential survey
Str ..... Stripping
Tr ..... Trenching
UG ..... Underground exploration/development
VLEM ..... Vertical loop electromagnetic survey
VLFEM ..... Very low frequency electromagnetic survey

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
1	Ashton Mining of Canada	N. Pickle Lake	DD
2	Aurora Platinum Corporation	N. Lansdowne House (Pd, Pt, Cu, Ni)	AEM, AM, DD, GM, GEM, GL, Samp
3	Avalon Ventures Ltd.–Global Canada Co. (Lilypad Lakes property)	Fort Hope (Ta, Cs, Li, Rb)	DD
4	Barrick Gold Corporation (MacLeod/Hardrock Mines)	Geraldton (Au)	Rehabilitation
5	Berland Resources Ltd. (Swole Lake property)	N. Lake Nipigon (Ta, Cs, Rb, Li)	Pr, Samp
6	Canabrava Diamond Corporation–Navigator Exploration Corp.	E. of North Caribou Belt	DD

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
7	Canplats Resources Corporation–Canadian Golden Dragon Resources Ltd. (Grand Bay property)	Lake Nipigon (Pd, Pt, Cu, Ni)	IP, GM, GEM, DD
8	Castagne, P.	N. Lake Nipigon (Cu, Ni, Pt, Pd)	Samp
9	Cote, M. and Cote, R. (Fulford Lake property)	McQuesten Township (Au)	Pr, Samp
10	Cote, Richard and Cote, Robert (Miner Lake property)	Pither Township (Au, Cu, Zn)	Pr, Samp
11	Cote, Richard and Cote, Robert (W. Archie Lake property)	Summers Township (Au)	Pr, Str, Samp
12	Cox, N. and Holt, L. (Final Lake property)	Altitude Lake (Pd, Pt, Cu, Ni)	Str, Samp
13	East West Resource Corporation (Havoc Lake property)	English Bay (Pd, Pt, Cu, Ni)	MEGATEM®, AM, GC, Lc
14	East West Resource Corporation (Norton Lake property)	Fort Hope (Pd, Pt, Cu, Ni)	GC, Lc, Samp
15	East West Resource Corporation (Pillar property)	Lake Nipigon (Pd, Pt, Cu, Ni)	GL
16	Freewest Resources Canada Inc.	N. Lake Nipigon (Ta, Sn, Cs, Rb, Li)	Pr
17	Grant, J.	N. Lake Nipigon (Au, Pd, Pt)	Pr
18	Greenland, H.	Geraldton (Au)	Pr, Samp
19	Holt, L. and Nelson, M. (Deeds Lake property)	Tashota (Cu, Ni)	Pr, Samp
20	Holt, L. and Nelson, M. (Koch Daneff occurrence)	Rickaby Township (Au)	Pr, Samp
21	Houghton, F.	Colter Township (Au)	GM, GEM, Pr, Lc
22	Houghton, F. and Neengae Gamik Environmental Management Northwestern Ontario	Legault Township (Au)	GL, Pr, Samp
23	Hunter Dickinson Inc.–Maple Minerals Inc.–East West Resource Corporation (Eva–Kitto townships property)	Beardmore (Pd, Pt, Cu, Ni)	GL, Pr, Samp
24	Indo Pacific Resources Ltd. (Melchett Lake property)	Nakina (Cu, Zn, Au)	Compilation
25	International Kodiak Resources Inc.–International Taurus Resources Inc. (Lincoln property)	Tashota (Au)	GL, IP, Str, Lc, Samp
26	Iron Lake Minerals Inc. (Iron Lake gold property)	Pickle Lake (Au)	DD
27	Koivisto, R., Elgin Mines Limited, Kukkee, K. and Tweedie, R.	N. Lake Nipigon (Pd, Pt, Cu, Ni)	Pr, Samp
28	Landore Resources Inc. (Junior Lake property)	N. Lake Nipigon (Pd, Pt, Cu, Ni)	DD
29	Linear Resources Inc. (Seymour Lake property)	N. Lake Nipigon (Ta, Cs, Rb, Li)	Pr, Tr, Str, Lc, Samp
30	Metalore Resources Ltd.	Georgia Lake (Ta, Cs, Rb, Li)	Compilation
31	Milks, G.	Tashota (Zn, Cu, Au)	Pr, Str, Samp
32	Norcal Resources Ltd. (Fry Lake property)	Fry Lake (Au)	Compilation
33	Northern Hemisphere Development (Falcon Lake property)	N. Lake Nipigon (Ta, Cs, Rb, Li)	Compilation

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
34	NWT Copper Mines Limited (Adair property)	Tashota (Au)	Pr, Samp
35	Ontex Resources Limited (Cherbourg, Brookbank and Foxcar properties)	Irwin Township (Au)	DD, Pr
36	O'Reilly, G. (Linklater Lake tin property)	N. Lake Nipigon (Sn)	Pr, Samp
37	Pettit, C.	Walters Township (Au)	Pr, Lc
38	PGM Ventures Corporation (Thierry Mine)	Pickle Lake (Cu, Ni, Pt, Pd)	Compilation, GL, Samp
39	Pifher Resources Inc.	Pifher Township (Pd, Pt, Cu, Ni)	GM, GEM, DD, Lc
40	Placer Dome (CLA) Limited	N. Caribou Belt (Au)	GL, Samp
41	Placer Dome (CLA) Limited/ TVX–Normandy Americas (Musselwhite Mine)	North Caribou Belt (Au)	DD, Mill/Mine Construction
42	Platinova A/S (Lamaune Lake–Zig Zag Lake property)	N. Lake Nipigon (Ta, Cs, Rb, Li)	Pr, Compilation
43	Platinova A/S (MNW property)	Georgia Lake (Ta, Cs, Rb, Li)	GL, Pr, Compilation
44	Roach, S. (Wobbegone property)	Metcalfe Lake (Zn, Cu)	GM, GEM, GL, Lc
45	Roxmark Mines Limited (Northern Empire Mine)	Beardmore (Au)	Bulk, Mill Renovation, Custom Milling
46	Roxmark Mines Limited (Sand River Gold Mine)	Beardmore (Au)	Bulk
47	Roxmark Mines Limited (Sturgeon River gold mine)	Irwin Township (Au)	Bulk
48	Roxmark Mines Limited (Wascanna Property)	Tashota Area (Au)	Pr, Lc, Samp
49	Sim, D.	Sim Lake (Pd, Pt, Cu, Ni)	GL, Pr, Samp
50	Spruce Ridge Resources Ltd.	Pifher Township (Au, Cu)	DD
51	Spruce Ridge Resources Ltd. (Final Lake property)	Altitude Lake (Pd, Pt, Cu, Ni)	GM, GEM, GL, Str, Lc, Samp
52	Sur American Gold Corp.	N. Lake Nipigon (Ta, Cs, Rb, Li)	Pr, Compilation
53	Thibault, D. and Smith, B. (Sim Lake property)	Sim Lake (Pd, Pt, Cu, Ni)	Pr, Samp
54	Valerie Gold Resources Ltd.	N. Lake Nipigon (Cu, Ni, Pt, Pd)	Compilation
55	Yzerdraat, W. and Roach, S. (Metcalfe–McDonough property)	Metcalfe Lake (Au, Cu, Zn)	Pr

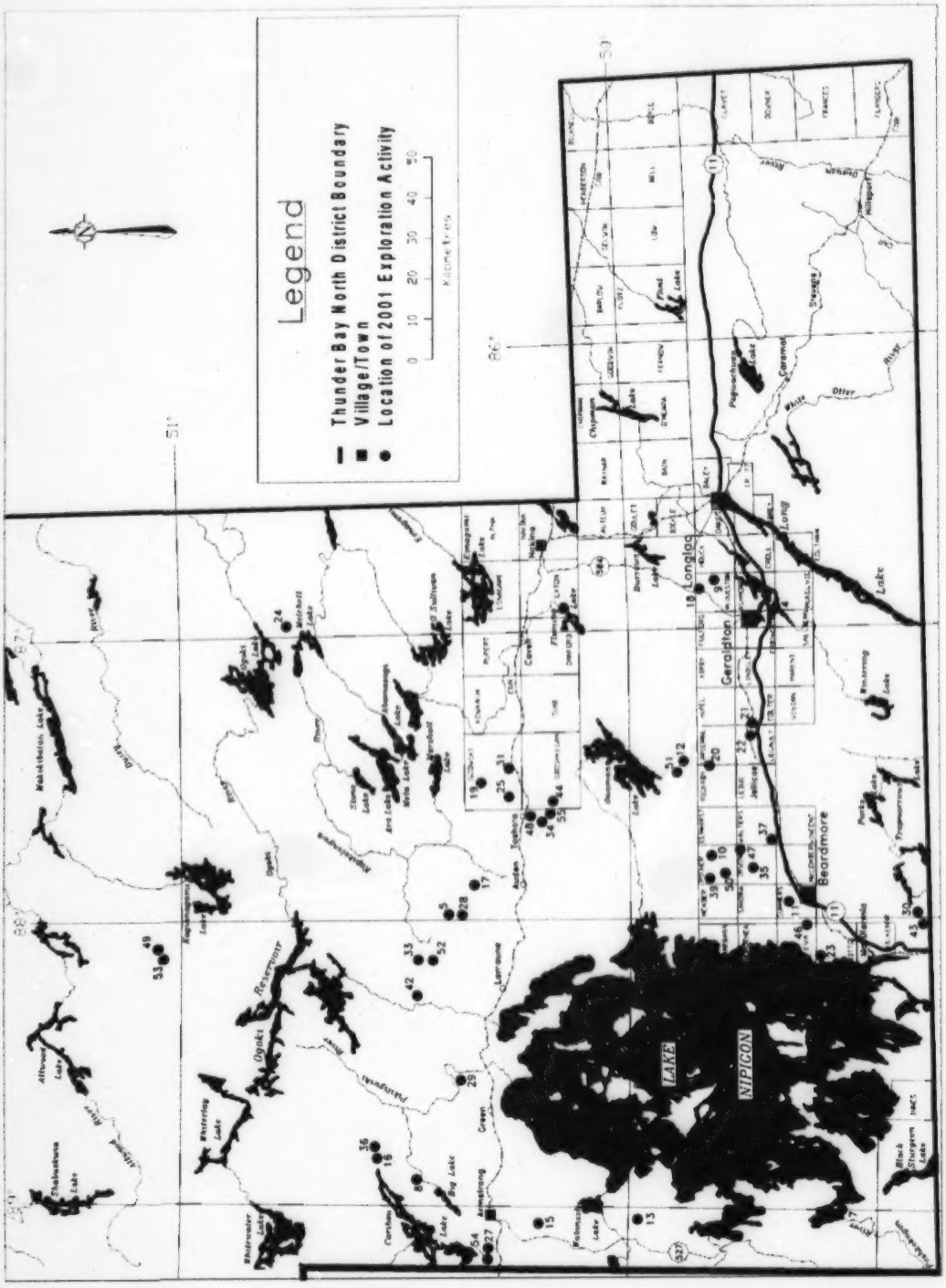


Figure 1. Thunder Bay North District (southeast map) exploration activity, 2001.

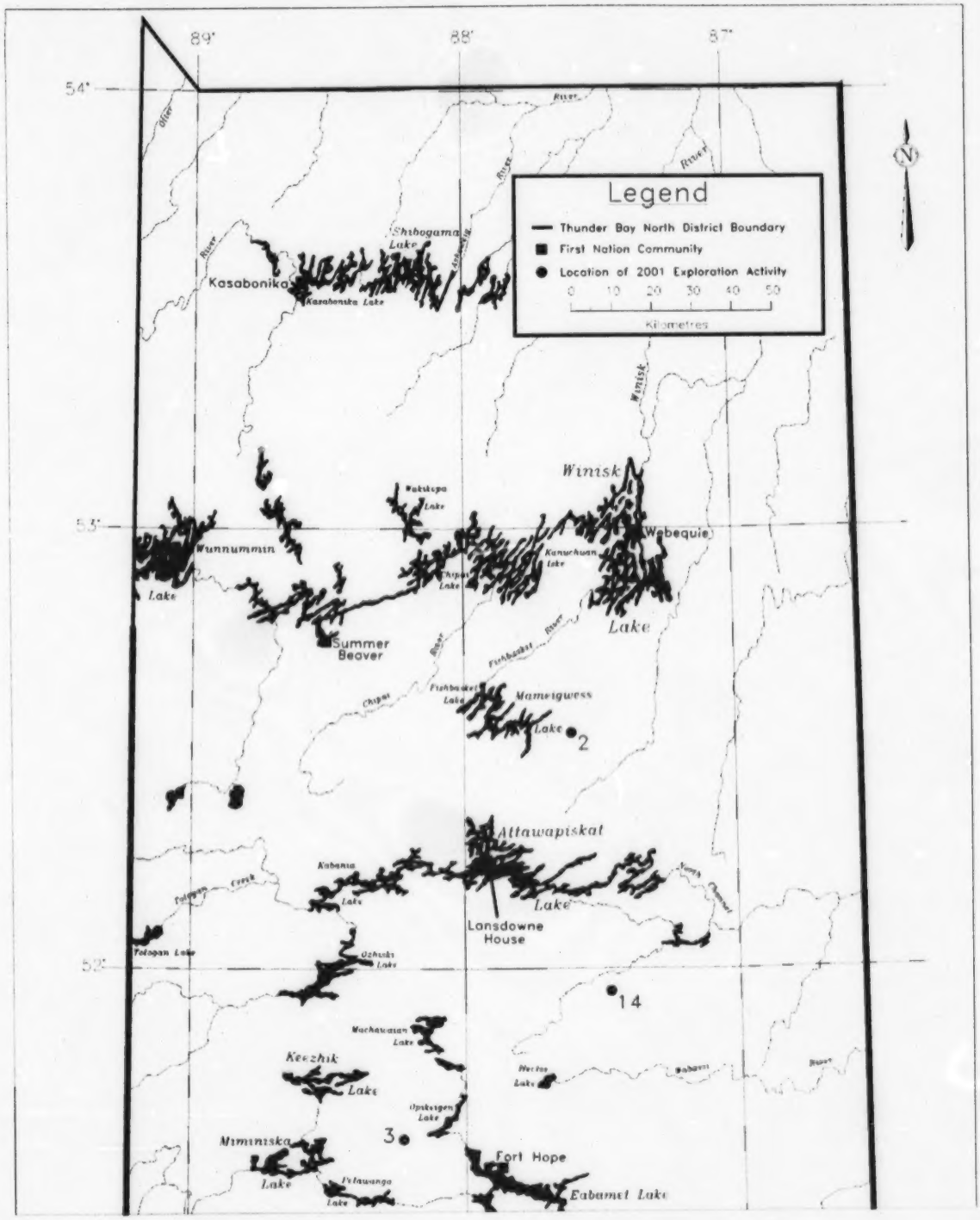


Figure 2. Thunder Bay North District (northeast map) exploration activity, 2001.

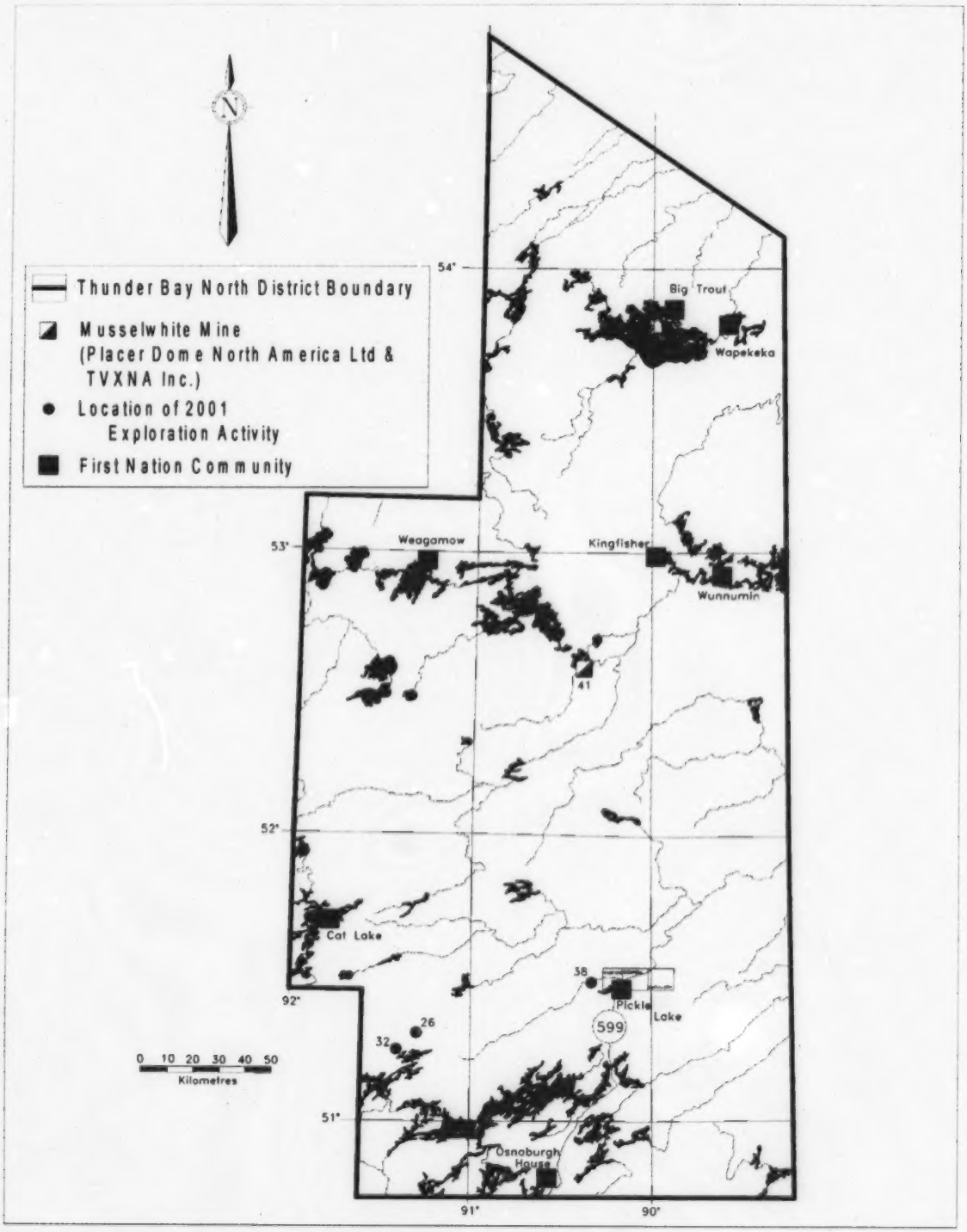


Figure 3. Thunder Bay North District (northwest map) exploration activity, 2001.

RESIDENT GEOLOGIST PROGRAM STAFF AND ACTIVITIES

During 2001, the staff of the Thunder Bay North Resident Geologist Program included: J. Mason, Regional Resident Geologist (July to December); G. White, Acting Regional Resident Geologist (January to April) and District Geologist (May to December); J. Scott, Acting Regional Resident Geologist (May and June); M. O'Brien, Acting District Geologist (January to April); C. Komar, Administrative Assistant; S. Warren, Acting District Support Geologist (January to April); and M. Tuomi, Acting District Support Geologist (October to December). Significant support to the program was also provided by J. Stewart, Acting Regional Support Geologist for the Northwest Region and A. Dowton, Administrative Assistant. E. Onabigon, Community Resource Geologist, delivered prospector education and information to First Nations. A. Drost, Regional Land Use Geologist coordinated and delivered land use planning in northwestern Ontario.

In 2001, 32 property visits were conducted (Table 3) and 68 Mineral Deposit Inventory (MDI) records were edited or entered. The Resident Geologist Program handled 2060 personal consultations and 1463 telephone inquiries in the Beardmore, Geraldton and Thunder Bay offices. The Beardmore field office, established in 1996 in conjunction with the community of Beardmore, was staffed one day per week, from May to October. The Geraldton field office was maintained in conjunction with the Northern Development Office two days per month, from May to October. Staff attended the Cordilleran Roundup in Vancouver in January, providing a display; the Prospectors and Developers Convention in Toronto during March, providing displays; the Northwestern Ontario Prospectors Association (NWOPA) Mines and Minerals Symposium in Thunder Bay in April, providing a display and talk; the Manitoba Mining and Minerals Convention in November, providing a display; and the Ontario Exploration Geoscience Symposium in December, providing a talk and display.

Table 3. Property visits conducted by the Thunder Bay North District in 2001.

Number	Property/Occurrence
1	Adair Gold Mine property (NWT Copper Mines Ltd.): Au
2	Alfred Lake property (R. Cote, M. Cote): Au, Cu
3	Beardmore Mill (Roxmark Mines Ltd.): Au
4	Blay Lake–Brink Occurrence (Metalore Resources Limited): Ta, Li
5	Camp 25 PGE Occurrence (R. Cote): Pd, Pt
6	Central Patricia Mine (Denroy Manufacturing Corp.): Au
7	Cleo Point (H. Goodman): Au
8	Crooked Green Creek Mine (Spruce Ridge Resources Ltd.): Au, Ag, Cu
9	Dik–Dik gold mine: Au
10	Deeds Lake area: Au, Cu, Zn
11	Dona Lake Mine (Placer Dome Inc.): Au
12	Eva–Kitto property (Hunter Dickenson Inc.): Pd, Pt
13	Final Lake PGE property (Spruce Ridge Resources Ltd.): Pd, Pt, Cu, Ni
14	Gorge Creek Unconformity
15	Koch Danceff occurrence (L. Holt, M. Nelson): Au
16	Leitch Gold Mine (Teck Corporation–San Paulo Res.): Au
17	Lincoln property (International Kodiak Res. Inc./International Taurus Res. Inc.): Au
18	MacLeod–Cockshutt Mine (Barrick Gold Corporation): Au
19	Missing Link Extension property (M. Nelson): Au
20	Missing Link property (N. Cox) Au
21	Musselwhite Mine (Placer Dome Inc.–TVX N.A.): Au
22	North Caribou properties (Placer Dome Inc.): Au
23	Northwind Lake area: Stone

Number	Property/Occurrence
24	North Kitto property
25	Partridge Lake–Turkey Lake property (F. Houghton): Au
26	Pickle Crow gold mine (Cantera Mining Ltd.–Wolfden Resources Inc.–Jonpol Exploration Ltd.): Au
27	Poplar Lodge Volcanics
28	Sim Lake property (D. Christianson): Pd, Pt
29	South Sim Lake property (D. Thibault, I. Spence): Pd, Pt
30	Thierry Mine (PGM Ventures Inc.): Pd, Pt, Cu, Ni
31	West Archie Lake occurrence (Rick Cote, Robert Cote): Au
32	Wobbegone property (S. Roach): Cu, Zn

PROPERTY EXAMINATIONS

Gold

ADAIR OCCURRENCE

The Adair property is located 3.2 km due south of the Tashota Station on the Canadian National Railway (CNR) mainline and approximately 71 km northeast of Beardmore. Metcalfe Lake, which lies along the western boundary of Oboshkegan Township, is situated 4 km southeast of the Adair occurrence. Access to the old shaft and dumpsite can be gained by travelling north on the Kinghorn Road, which intersects Highway 11 7.5 km east of Jellicoe, and by proceeding north to the 80 km marker. The main occurrence is reached by travelling approximately 8.5 km west from this point along an old winter cut road to the site. NWT Copper Mines Ltd. controls two contiguous claim blocks totalling 31 units (TB 1247049 and 1240491) covering both the Adair occurrence and what is known as the "Knapp Prospect" (Amukun 1977) to the southeast. Preliminary work by the company during the 2001 field season included prospecting and sampling. A detailed, mineralized stripping and channel sampling program is planned for the 2002 season.

Amukun (1977) described the exploration history of the Adair property:

> George H. Adair made a gold discovery along Tashota Creek approximately 3.2 km south of the Canadian National Railway Station at Tashota in 1924 (Gledhill 1925). His property consisted of six claims including KK 986, KK 989, KK 990 and KK 996. Considerable surface work was done on the property including channel sampling, grab and chip sampling, and trenching. A 7.9 m (27-foot) vertical shaft was sunk on a "high-grade" quartz vein on claim KK 990. A shipment of 34 tons of ore from this shaft returned 0.442 ounce of gold per ton and minor silver (Rodgers and Young, 1932, p.9). By 1930 the shaft had been deepened to a depth of 20 m (70 feet) (Kudce 1931, p.94). Tashota Creek Gold Mines Limited controlled the Adair property in 1934 and completed stripping, sampling, road cutting and erection of buildings (Halstead 1947). In 1944, Invaday Mining and Exploration Limited owned and controlled a group of ten contiguous claims including the six Adair claims, at which time a limited amount of surface work was conducted. In 1961, the six Adair claims were known as the Rowan "990" claim group. Four diamond-drill holes (Tr. 3, 5, 7 and 8) totalling 167.3 m (549 feet) were drilled by the holders. By 1965, the Adair property was included in the property of V. Feely which consisted of 12 unpatented, contiguous mining claims. A self-potential and ground magnetometer survey were conducted by V. Feely and D. Seppa over the 12 claims in 1965. Several anomalies were located by the survey, and three of these were proposed to be tested by shallow diamond-drill holes but never initiated.

In 1973, New Fenimore Iron Mines Limited contracted Derry, Michener, and Booth Limited to conduct a survey of the 20-claim group covering the Adair occurrence. Geological mapping, a magnetic survey and mechanical trenching and blasting were completed with inconclusive results (Amukun 1977). During this same period (1973), Amukun (1977) of the Ontario Geological Survey (OGS) completed a 1:15 840 scale mapping program in the Tashota area and described the economic geology of the Adair property:

> At the Adair property, gold occurrences were almost exclusively associated with narrow veins of quartz predominantly with sheared mafic metavolcanics and derived schist. Sheared quartz and/or feldspar porphyry dikes and derived quartz-

sericite schist are invariably intruded into the mafic metavolcanics in the vicinity of the mineralization. The metallic minerals associated with the gold in the veins and identified in the feldspar are: pyrite, pyrrhotite, chalcopyrite, galena and sphalerite. Five selected grab samples collected by the field party from the Adair shaft area returned the following metal values:

	Cu%	Pb%	Zn%	Gold oz per ton	Silver oz per ton
Sample 1	0.12	0.10	Tr.	0.07	Tr.
Sample 2	0.05	1.60	Tr.	2.41	2.34
Sample 3	0.17	4.65	0.19	5.86	3.60
Sample 4	0.45	3.18	0.18	14.86	6.84
Sample 5	0.05	0.03	Tr.	0.01	Tr.

When the shaft was sunk in 1925, it exposed a vein of quartz 0.6 m (2 feet) wide extending downward for 1.5 m (5 feet), and carrying over an ounce of gold, and also a quartz vein about 0.9 m (3 feet) wide, widening out to 1.2 m (4 feet) at the 7.6 m (25-foot) level; also channel assay results gave over 9 ounces per ton gold (Halstead 1947, in Regional Geologist's Files, Ontario Ministry of Natural Resources, Thunder Bay) and some silver. Other grab and chip sample results from the surface and underground workings returned encouraging values of gold and silver.

From 1983 to 1984, Teck Exploration Limited conducted a ground magnetometer and VLF–EM survey over a 49-claim group covering the Adair occurrence (TB 406052). A moderate coincident VLF–EM/magnetic anomaly, located approximately 100 m east of the Adair shaft, may be indicative of an auriferous shear zone (Penno 1984). This was followed by a 7-hole diamond drilling program. In 1989, F. Goodman conducted a limited prospecting and power stripping program under an Ontario Prospector Assistance Program (OPAP) grant in the vicinity of the Adair shaft area. In 1995, Clark–Eveleigh Consulting was contracted by property owners M. Shuman and B. Fowler to evaluate the Tashota Creek property, which consisted of four contiguous claim blocks (47 units). Geological mapping and sampling covering the old shaft, pits and trenches of the Adair showing returned assay values up to 0.861 and 1.032 ounces per ton gold. These results were obtained from samples of sheared quartz vein material containing 1 to 5% pyrite, pyrrhotite, chalcopyrite and galena, and from fine- to medium-grained biotite-amphibole-rich "metavolcanics" (*sic*) with up to 1% disseminated pyrite (Maclean 1995).

In 1996, G.M. Stott and J.R. Parker of the OGS conducted a structural mapping program in the Metcalfe Lake area, as part of a multi-year program to remap and synthesize major parts of the Onaman–Tashota greenstone belt (Stott and Parker 1996). Detailed mapping in the central portion of the belt covering the Adair property indicates the presence of "dacitic flows intruded by gabbroic sheets". Stott and Parker (1996) also stated: "Lithologic contacts between newly identified long, tabular gabbroic intrusions and rhyolitic and basaltic volcanic rocks are locally sheared and host quartz and iron carbonate veins and disseminated sulphide minerals. Exploration for new gold-bearing zones could focus along these sheared contacts between the gabbro sheets and their host rocks." Evidence from analyses of recent samples collected at the Adair occurrence indicates these gabbroic sheets may also have PGE potential.

Preliminary sampling of the Adair shaft area by both the current property owners, NWT Copper Mines Ltd., and staff of the Thunder Bay North Resident Geologist office during the 2001 field season, returned gold assay results similar to past findings. Grab samples consisting of sheared, recrystallized quartz vein material and altered biotite-amphibole-rich wall rock containing up to 10% (average 1 to 2%) disseminated grains and seams of pyrite, chalcopyrite and galena, assayed as high as 0.713 and 3.38 ounces per ton gold. It is interesting to note that a sample collected by the Resident Geologist staff, approximately 20 m northeast along strike from the main shaft/pit area, returned 242 ppb Pd and 85 ppb Pt (from the same sample that assayed 3.38 ounces per ton gold). Amukun (1977) also reported anomalous platinum values in one sample. The PGE potential of this area should be considered due to the presence of biotite-amphibole-rich wall rock, which is likely altered, fine- to medium-grained gabbro. This mafic unit is found both in outcrop and as loose, angular pieces dominating the dump material adjacent to the Adair shaft.

Exploration activities in 2002 by NWT Copper Mines Ltd. will concentrate along the northeastern strike of the occurrence where a string of 1920s-vintage pits and trenches has been traced for up to 300 m.

LINCOLN OCCURRENCE

The Lincoln gold occurrence is situated within the central portion of the Onaman–Tashota belt, approximately 73 km northeast of Beardmore. The CNR mainline crosses the area 2 km south of the main work site, in the southwest corner of Gzowski Township. Access is provided by the Kinghorn logging road (via Highway 11 east of Jellicoe) which traverses the central portion of the property.

A mechanical stripping and sampling program was initiated by property owners, NWT Copper Mines Ltd., during the 1999 field season at the north and south shaft zones. These two zones are separated by 500 m along a north-northwest-trending line. The two shafts were sunk during some of the early work conducted on the Lincoln claims from 1917 to 1928 (for a complete exploration history of the Lincoln property, *see* Mason et al. (2000, p.18). Highlights from the 1999 program completed by NWT Copper Mines Ltd. included two chip/channel samples indicating significant high-grade gold. One sample returned 0.904 ounce per ton gold over 2.74 m (9 feet) and a second returned 1.77 ounces per ton gold over 1.83 m (6 feet) (Mason et al. 2000). In 2000, the Lincoln property, which consists of 10 claims (76 units), was optioned to International Taurus Resources Inc., which joint-ventured the project with International Kodiak Resources Inc. Field work in 2000 consisted of mechanical stripping and washing, followed by detailed mapping and sampling. Seventy-five trenches and stripped zones, covering a 350 by 800 m area, were exposed during the operation. In early 2001, the companies hired Geosig Inc. to complete an 8.8 km long induced polarization (IP) survey covering the main zones. A company website report (http://www.kodiak-resources.com/; January 11, 2002) indicated: "The survey led to the detection of 17 anomalies, most of which have a north-south trend. Four of these IP anomalies have been identified as high priority targets that warrant ground proofing."

A summary of the results from work conducted by International Kodiak Resources Inc. (ibid.) during the 2001 summer field season, which included additional stripping, sampling and detailed mapping, is given as follows:

> The 2001 exploration program at the Lincoln property was successful in delineating a number of mineralized zones within three main areas: the North Shaft, the South Shaft and the Eastern Limb. Sampling at the North Shaft area delineated a zone approximately 5-12 metres wide and discontinuous over at least an 80 m strike length with grades up to 6.67 g/t Au. The zone is open to the north and south. In the South Shaft area, exploration has identified a significant mineralized zone approximately 100 m long and 15-40 m wide, with gold values typically from 0.5 to 1.9 g/t Au, and locally up to 53.9 g/t Au. Work at the Eastern Limb defined an open-ended mineralized zone 9-15 m wide and 40 m long, with grades form 1.1-2.2 g/t Au. Work on the remainder of the Eastern Limb, over a strike length of approximately 500 metres, has identified numerous 1-2 m intervals with over 1 g/t Au.

The January 11, 2002, web site release by International Kodiak Resources Inc. also discussed the local geology and mineralization of the Lincoln gold property:

> Gold, copper, sulphides, arsenopyrite and pyrite occur in quartz vein zones up to 20 metres wide cutting both feldspar porphyry and surrounding metamorphic rocks. Recent sampling has confirmed previous high-grade assays over one- to three-metre widths. Also of interest is the occurrence of significant gold values in the feldspar porphyry and other host rocks. This feature, the importance of which has not been previously recognized, shows potential for a large bulk-tonnage gold deposit in addition to the prospect of near-term high-grade gold production from the veins.
>
> The mineralogy of the gold-bearing veins consists of massive quartz with minor pyrite, chlorite and tourmaline. Carbonate minerals fill fractures and line the margins of the veins. Chalcopyrite and arsenopyrite occur rarely. Gold is free and probably also occurs with the pyrite. Host rocks, whether greenstone, schist or intrusive, are silicified, carbonatized and pyritized with an average pyrite content of five percent.

Further work is recommended, including 1000 m of diamond drilling in conjunction with additional stripping and channel sampling, primarily concentrated in alteration zones along the eastern limb and south shaft areas. The objective is to test the depth of mineralization and to extend the surface area of the currently delineated zones. The company also plans to investigate the potential existence of a western limb as part of a north-plunging fold structure. Inconsistent results at the north shaft, likely caused by the nugget effect, should focus further work on bulk sampling of the quartz veins in order to reproduce historic high-grade gold values (Vanwermeskerken and Jaworski 2001).

Platinum Group Elements (PGE)

FINAL LAKE PGE OCCURRENCE

Exploration work continued on the Final Lake PGE property, located north of Lapierre Township and approximately 45 km northeast of Beardmore, during the 2001 field season. The property currently consists of 22 contiguous claims (98 units) and was optioned from owners N. Cox and L. Holt by Spruce Ridge Resources Ltd. in 2001. Mechanized stripping and washing, detailed channel sampling and selected VLF–EM and magnetometer surveys were conducted over two main zones (Ryan 1 and 2) in the southeast portion of the claim group. The property is accessible by the Kinghorn–Altitude–Fullerton Lake road network by driving north from Highway 11, east of Jellicoe. A compilation of all past exploration work and significant results related to PGE-Cu-Ni mineralization follows (Assessment Files, Resident Geologist's Office, Thunder Bay):

1968: Noranda Exploration Company Limited conducted a ground magnetometer and electromagnetic (EM) survey over a 14-claim block surrounding Final Lake. Results indicated strong coincident anomalies (along a northwest trend) over "areas of visible copper-nickel mineralization" (Cross 1968). Drilling and trenching were recommended.

1970: Canadian Nickel Company Ltd. diamond drilled several shallow holes (30 m) on current claim TB 1240494 in the Oasis Lake area. Zones of gabbro and amphibolite contained seams of 70% pyrrhotite and up to 3% disseminated pyrrhotite and chalcopyrite.

1971: Hudson Bay Exploration and Development Company Limited conducted diamond drilling in 3 holes over 2 grids south of Altitude Lake, 2.5 km east of the present claim group. Intersections of "coarse-grained, dark green banded andesite" (Vowles 1971) containing up to 10% pyrrhotite, pyrite and chalcopyrite were described.

1973: Amax Exploration, Inc. (Altitude Group) completed an integrated program of geological mapping, geophysics and diamond drilling over a 6-claim block, southwest of Altitude Lake (present claim TB 1240497). Two diamond drill holes were completed over a strong coincident magnetometer-EM anomaly across the central portion of the property. Sulphide zones ranging in width from 2 to 4 m, containing "mafic bands of chlorite and hornblende" (Steers 1973) and averaging 5 to 20% pyrrhotite, pyrite and chalcopyrite (as high as 90%), were delineated.

B.B.M. Investments Limited diamond drilled 2 holes at the west end of Final Lake on current claims TB 907640 and TB 907643. Intersections of up to 22 m (73 feet) of massive medium-grained metagabbro and amphibolite containing 2% pyrrhotite were encountered.

1987: Coulson Exploration Inc. completed an airborne magnetic survey over the Final–Oasis–Eastbrook lakes area. Several zones of strong magnetic anomalies were delineated, particularly south and west of Final Lake, along a northwest trend.

1988: Aerodat Limited of Toronto flew a large magnetic–electromagnetic (EM) survey covering the Tashota–Geraldton greenstone belt for the Ontario government. A region of intense magnetic "highs" and coincident first- and second-order EM anomalies exist along a northwest trend across the Final Lake area.

1992: R. Davies of Toronto, with two Ontario Prospector Assistance Program (OPAP) grants, conducted a detailed soil geochemical and geophysical program over a claim group southeast of Altitude Lake, approximately 2 km east of the Final Lake PGE property. Significant anomalous Cu, Ni, and Co values were obtained in till samples along a well-defined ground EM conductor that extends southeast from Altitude Lake to Bieber Lake. A property report (Davies et al. 1993) stated that "...the conductor is strong and characteristic of a zone containing massive sulphides" and is "identified to be the likely extension of a conductive zone previously drilled by Hudson Bay Exploration and Dev. Co. Limited (1971) in the Bieber Lake area".

The Final Lake PGE property lies within a northwest-trending unit of medium- to coarse-grained gabbro and amphibolite as mapped by Kresz (1991) of the OGS. This intrusive body occurs at the contact between granitic

rocks of the Onaman Lake pluton to the north and the Onaman–Tashota metavolcanic rocks to the south (Kresz 1991). The northwestern portion of this mafic unit remains unmapped and unexplored for PGE-sulphide mineralization.

A detailed discussion of the ground work (and results) conducted by Spruce Ridge Resources Ltd. on the Ryan zones is given by Bowdidge (2002):

> Stripping has exposed two mineralized zones, referred to as the Ryan 1 and Ryan 2. The Ryan 1 Zone is exposed at the north side of the stripped area. It is exposed for a length of 15 m, and has a maximum exposed width of 1.5 meters. Its full width is not exposed because the bedrock surface slopes steeply down under deep overburden, and both ends disappear under heavy cover. The zone strikes about 110° AZ. The rock is a highly weathered, soft, dark green, fine- to medium-grained chloritic material of apparent mafic composition. It is mineralized with 20-80% fine grained sulphides: pyrite>pyrrhotite>chalcopyrite>pentlandite(?). Nine grab samples were collected and analysed with the following results: Cu varied from 310 to 3660 ppm, Ni from 1360 to 3450 ppm, Pt from 10 to 108 ppb, Pd from 150 to 1227 ppb and Au from 10 to 100 ppb. Four channels were cut with a diamond saw. Channel 1 gave an average of 1261 ppm Cu, 1966 ppm Ni, 80 ppb Pt, 380 ppb Pd and 27 ppb Au over 1.8 m (average of two sets of samples from duplicate cuts). Channel 2 gave an average of 1583 ppm Cu, 1660 ppm Ni, 92 ppb Pt, 284 ppb Pd and 45 ppb Au over 1.8 m. Channel 3 gave an average of 1708 ppm Cu, 1348 ppm Ni, 102 ppb Pt, 152 ppb Pd and 14 ppb Au over 1.2 m. Channel 4 gave 1580 ppm Cu, 1990 ppm Ni, 99 ppb Pt, 293 ppb Pd and 14 ppb Au over 1.0 m.
>
> South of the Ryan 1 Zone is an area of complex geology, with several different phases of gabbro and diabase forming irregular dykes and variably shaped masses showing mutually intrusive contacts. This passes southwards into the Ryan 2 mineralized zone, which consists of a coarse-grained gabbro containing up to 5% disseminated chalcopyrite-pyrrhotite. Six grab samples were collected and analysed: They gave from 1530 to 3610 ppm Cu, from 890 to 2590 ppm Ni, from 30 to 81 ppb Pt, from 96 to 183 ppb Pd and from 39 to 90 ppb Au. The Ryan 2 mineralization has the appearance of primary magmatic sulphide mineralization. It is exposed over an area of 30 m by 25 m and disappears under overburden to the south and west.

Grab sampling by staff of the Thunder Bay North Resident Geologist office, prior to the completion of stripping, on the Ryan 1 and Ryan 2 zones returned values up to 3270 ppm Cu, 2747 ppm Ni, 61 ppb Pt, 286 ppb Pd and 61 ppb Au. Preliminary prospecting and sampling west and northwest of the main Ryan zones has uncovered anomalous copper-nickel mineralization within the host mafic intrusive unit. Considering the success of the recent (2001) exploration program by Spruce Ridge Resources Ltd. in the discovery of Cu-Ni-PGE mineralization within a relatively small portion (southeast corner) of an unexplored mafic intrusive body, the potential for finding additional mineralization is significant. Continued exploration by the company in 2002 along a northwest trend following gossanous, disrupted zones or mixing zones at the granite-greenstone boundary, is recommended.

Rare Metal Pegmatites

SEYMOUR LAKE PROPERTY

The Seymour Lake property is located 44 km east-northeast of Armstrong and 2.7 km west of Seymour Lake. The property consists of 13 claims (TB 1245645, TB 1245646, TB 1245648, TB 1245661-64, TB 1246719, TB 1246720 and TB 1246732-35) totalling 165 claim units. Linear Resources Inc. optioned the claims from M. and S. Stares, of Thunder Bay. The Seymour Lake property, which includes the North and South Aubry pegmatite zones and the Seymour pegmatites, is accessible from Armstrong via forest access roads and trail.

Nelson Aubry, a prospector from Nakina, discovered the North and South Aubry zones in 1957. The Anaconda Company (Canada) Limited conducted line cutting, detailed mapping, sampling and diamond drilling in 1957, including 11 drill holes in the North Aubry and 4 drill holes in the South Aubry zone. During 1979, Cominco Ltd. and E&B Explorations Inc. conducted line cutting and a ground magnetic survey (Assessment Files, Resident Geologist's Office, Thunder Bay).

Linear Resources Limited conducted prospecting, trenching, sampling, channel sampling and geological mapping. Eight trenches were blasted and sampled: 5 trenches (NA1 to NA5) on the North Aubry zone, covering a 210 m strike length; and 3 trenches (SA-1 to SA-3) on the South Aubry (located 600 m to the south of the North Aubry zone) covering a 120 m strike length (Press Release, Linear Resources Limited, July 16, 2001). Four channel cuts taken by Linear Resources produced 14 samples in Trench 5 over an approximate 45 m length (Press Release, Linear Resources Limited, July 3, 2001).

The Seymour Lake property is located within the eastern portion of the Wabigoon Subprovince proximal to the subprovince boundary with the English River Subprovince to the north. The Seymour Lake property is within a large (Ta, Cs, Rb, Li, Be) pegmatite field that extends from Linklater Lake in the west, to Toronto Lake in the east. Detailed mapping has been conducted by Sutcliffe (1988) in the western portion of the rare-element pegmatite field, Gussow (1940) east of Hollingsworth Lake, and Pye (1968) in the central and eastern portions.

The North Aubry zone and South Aubry zone are albite-spodumene pegmatites (Černý 1989) that intrude pillowed metavolanic rocks and amphibolite (Pye 1968).

Breaks et al. (2001) described the Seymour Lake property:

> Two large pegmatite dikes of the albite-spodumene type (Černý 1989) are situated 2.7 km west of Seymour Lake along a prominent ridge that has approximately 100 m of local relief. Recent exploration for tantalum by Linear Resources Limited has exposed the North Aubry pegmatite in 5 trenches over 265 m and the South Aubry pegmatite in 3 trenches over 120 m. Trench numbering, referred to in this report, follows that of Linear Resources Limited.
>
> The North Aubry pegmatite varies from 15 to 75 m in width and is at least 265 m in strike length. The South Aubry pegmatite, situated 800 m to the south, is at least 120 m in strike length with a width of up to 50 m as exposed in 3 trenches. The highest tantalum values found by this company occur in Trench 5 of the North Aubry pegmatite where 15 samples ranged from 0.029 to 5.7% Ta_2O_5. An average of 2.39% Ta_2O_5 was obtained from 4 successive channel samples of 1 m each near the eastern end of Trench NA-5 (Linear Resources Limited, News Release, July 3, 2001). Further results from other trenches (Linear Resources Limited, News Release, July 16, 2001) include 0.036% Ta_2O_5 across 5.7 m in Trench NA-4; 0.027% Ta_2O_5 across 5.1 m in Trench NA-3; 0.42% Ta_2O_5 across 2 m in Trench NA-4; and 0.026% Ta_2O_5 across 17.6 m in Trench NA-2. The South Aubry pegmatite has also been extensively channel sampled by Linear Resources Limited who reported Ta_2O_5 contents up to 0.028% over 1 m. Most of the North Aubry pegmatite exhibits little internal zonation, which is typical of pegmatites of the albite-spodumene-type (Černý 1989). The main unit consists of a coarse muscovite-green spodumene-quartz-potassium feldspar-cleavelandite assemblage augmented by layers and irregular masses of primary aplite, quartz-rich patches and sparse muscovite-rich, greisen-like pods. Randomly oriented, coarse green spodumene, up to 35 by 35 cm in basal sections and 20 cm by 1.6 m parallel to the long dimension, comprise 30 to 40% of the main pegmatite unit.
>
> Accessory minerals in the pegmatite include light green, white and scarce light pink beryl up to 15 by 17 cm in basal sections, manganocolumbite, manganotantalite, lepidolite, and sparse black tourmaline, garnet, ferrocolumbite, microlite, ferrotapiolite and zircon.
>
> Primary sodic aplite occurs in pods, up to 60 cm by 1 m, and in layers within the spodumene-rich pegmatite that are up to 1 m thick and at least 6 m in length. This unit mainly consists of sugary quartz and albite with minor blue apatite and muscovite. Near the eastern end of Trench NA-2, primary aplite pods are enveloped in a quartz-rich mass with notable concentrations of black, manganotantalite along the contact between the aplite and quartz-rich masses.
>
> Quartz-rich masses consist of 70 to 80% grey quartz and typically contain the coarsest blocky potassium feldspar crystals (up to 95 cm by 2.5 m). Petrographic evidence suggests the following sequence of mineral crystallization: apatite, early quartz, early oxide → spodumene → potassium feldspar, albite → beryl → late oxide → late quartz.
>
> Miarolitic cavities, up to 5 by 6 cm in size, occur in cleavelandite-rich aplite of Trenches NA-4 and NA-5 and are mainly lined with cleavelandite crystals with minor muscovite and tourmaline, all of which are coated by a drusy film of hematite.
>
> Field and chemical evidence indicates that the most chemically evolved part of the North Aubry pegmatite is situated in Trench NA-5, where high Ta_2O_5 values were obtained in the channel samples of Linear Resources Limited. The electron microprobe results (180 analyses) confirm these high bulk rock Ta_2O_5 levels as an average of 80.7% Ta_2O_5 (maximum = 84.9%) was attained on samples from Trench NA-5. The data from Trench NA-5 represent the most tantalum-rich manganotantalite documented to date in Ontario. Average Ta_2O_5 contents in columbite-tantalite group minerals for Trenches NA-1 to NA-4, listed below, were somewhat lower, but still significant in terms of the potential delineation of economic tantalum mineralization. The analyses collectively reveal a strong manganese-suite trend for the North Aubry pegmatite (Figure 39.12).
>
> - Trench NA-1: 58.7% Ta_2O_5
> - Trench NA-2: 49.2% Ta_2O_5
> - Trench NA-4: 50.7% Ta_2O_5
>
> The most spectacular manganotantalite mineralization was encountered in Trench NA-5. The North Aubry pegmatite is partly exposed in this trench as erosional remnants of flat-lying thin sheets that strike 155° with a dip of 15° southwest. At the east end of this trench, the pegmatite is zoned, marked by an outer zone that is a 60 cm thick sodic aplite unit composed of quartz, cleavelandite and sparse, platy black oxide grains. The aplite symmetrically envelops a core zone of muscovite-pink beryl-potassium feldspar-spodumene-quartz-cleavelandite pegmatite that is at least 3.5 m thick. In the west part of the

trench, the flat-lying sheets are connected with subvertical aplite dikes suggesting that a "stacked" pegmatite-aplite emplacement system is present, therefore, more flat-lying pegmatite-aplite sheets could occur at depth.

Coarse, black, subhedral to euhedral, manganotantalite crystals, up to 3.5 by 5 cm, are amongst the largest crystals observed by the authors in northwest Ontario. These crystals occur within the interstices between coarse, randomly oriented blades of faint green to locally light pink spodumene, best described as a "box-work" texture. The manganotantalite is commonly partly or completely enveloped by white cleavelandite. The manganotantalite crystals resulted from primary magmatic crystallization since no petrographic evidence of subsolidus, replacement stage albitization could be found. Several coarse crystals of faint pink beryl occur in the spodumene pegmatite unit and reach 20 cm in basal sections. Lepidolite, as narrow books up to 2 cm wide and 10 cm in length, also occur in the spodumene pegmatite and could represent a late alteration of muscovite.

Extensive lithium metasomatism is evident in the pillowed, mafic metavolcanic host rocks near the west end of Trench NA-5. The host rocks, also with local calc-silicate segregation of epidote-quartz-carbonate, are bright blue due to high concentration of randomly oriented holmquistite needles. A channel sample of 20 cm cut across one of the holmquistite-rich pillows revealed 7519 ppm Li that indicates significant lithium metasomatism. Thus, lithium may be a potentially useful element in detecting other rare-element pegmatites by lithochemical surveys on the property and adjoining areas.

The South Aubry pegmatite, which is up to 50 m in width, largely consists of muscovite-rich potassic pegmatite, characterized by impressive ovoid symplectites of quartz-muscovite. These segregations, up to 1 m in diameter, contain approximately equal amounts of quartz and muscovite.

Green spodumene is considerably lower in abundance in the South Aubry pegmatite and is mainly confined to layers, up to 4 m thick, that also contain faint green beryl-quartz-blocky potassium feldspar and cleavelandite. Veins of the spodumene pegmatite locally transect the muscovite-rich potassic pegmatite. Platy black oxide minerals, mainly as radiating aggregates up to 1 to 6 mm by 2 cm, occur locally in the spodumene pegmatite.

Linear Resources Inc. plans further exploration work in 2002.

Table 4: PGE targets in the Thunder Bay North District in 2001.

Property / Deposit (Location)	Owner(s) / (Vendor(s)	Geology / Mineralization	Age	Reserves / Assays
Big Trout Lake	Platinex Inc. (Simon Baker)	Layered gabbro – 35 km long intrusion	Archean	Chromitite layers, PGE assays
Caramat Lake (Pic River)	Onesime Albert	Large gabbro and diabase dike	Proterozoic	5.18% Cu, 1.45% Ni in grab samples. PGE?
Cote Float (Geraldton)	St. Anthony Resources Inc.– TLC Resources Inc.	Disseminated chalcopyrite, pyrrhotite in medium- to coarse-grained gabbro	Unknown?	>1 g/t PGE
Deeds Creek	Nolan Cox	Semi-massive chalcopyrite, pyrrhotite, pyrite	Archean	
Eva–Kitto townships (Lake Nipigon)	Hunter Dickinson Inc.– Maple Minerals Inc.– East West Resource Corporation	Ultramafic intrusion – 6 km (in diameter) ring dike or cone sheet – peridotite to olivine gabbro	Proterozoic	PGE assays to be determined
Final Lake (Jellicoe)	Spruce Ridge Resources Ltd.	Gabbro/ultramafic intrusions	Archean	0.3 to >1 g/t PGE (grab samples)
Jacobus deposit (Beardmore)	NWT Copper Mines Ltd. (Nolan Cox)	2 to 5% disseminated chalcopyrite, pyrrhotite, pyrite in Pinel Lake gabbro intrusion	Archean	1 million t grading 0.94% copper + nickel; low to unknown PGE values
Juneau Lake deposit (Lake Nipigon)	Landore Resources Inc.–Brancote Holdings	Massive pyrrhotite with minor chalcopyrite, pyrrhotite, pentlandite, and magnetite, associated with large anorthositic gabbro sill	Archean	2.2 million t grading 0.87% nickel, 0.59% copper; preliminary PGE assays >1 g/t
Lamaune Lake occurrence	Inco Limited	Disseminated to semi-massive chalcopyrite, pyrrhotite, pyrite in gabbro and peridotite/pyroxenite	Archean	0.89 g/t Pt, 0.88 g/t Pd in grab samples
Lavoie Lake deposit (Lansdowne House)	PGM Ventures Inc. (Norman Brewster)	Disseminated chalcopyrite, pyrrhotite, pyrite in layered anorthositic gabbro intrusion	Archean	14.6 million t grading 0.58% copper, 0.37% nickel; unknown PGE values

Property / Deposit (Location)	Owner(s) / (Vendor(s)	Geology / Mineralization	Age	Reserves / Assays
Linsey Bay property (Shabuskwia Lake)	Ken Fenwick, Don Leishman, James Bond	7 copper-nickel occurrences on property; disseminated chalcopyrite, pyrrhotite, pyrite in 600 m x 25 km anorthositic sill	Archean	2.3% Cu, 0.62% Ni, 0.26% Co, PGE?
Norton Lake	East West Resource Corporation	Massive pyrrhotite, pyrite in 8 m wide band in synform of volcanic/gabbro sequence	Archean	1 million t grading 0.72% nickel, 0.56% copper; unknown PGE values
Standingstone Lake (Beardmore)	John Ternowesky	Semi-massive pyrrhotite, pyrite as lenses at mafic volcanic/gabbro contact	Archean	1.3 g/t PGE (grab samples), 1.08% Cu, 3700 ppm Ni
Sim Lake (Armstrong)	(1) Whalen Resources (Doug Thibault, Basil Smith) (2) Dave Sim	1 to 5% disseminated chalcopyrite, pyrrhotite, pyrite, medium- to coarse-grained gabbro, some pegmatoidal/brecciated phases	Archean	>1 g/t PGE (grab samples)
Thierry Mine (Pickle Lake)	PGM Ventures Inc. (Norman Brewster)	Semi-massive to massive sulphides	Archean	7 million t grading 1.88% copper, 0.23% nickel, up to 0.30 ounce palladium per ton and 0.07 ounce platinum per ton
Tyrol Lake (Beardmore)	Pifher Resources Inc. (Gary Conn)	Mafic–ultramafic intrusions	Archean	Assays pending
Vista–Quest Lake plugs	unstaked	Small gabbro plugs, east portion of Sturgeon Lake belt	Archean	Sulphide mineralization, including chalcopyrite, has been noted
Weese Lake	Encampment Resources	Disseminated and patchy chalcopyrite, pyrrhotite, pyrite in large gabbro intrusion	Archean	0.12 to 1.75% Cu; PGE to be determined

RECOMMENDATIONS FOR EXPLORATION

Operation Treasure Hunt—Lake Sediment Survey 2000

ARMSTRONG–LAKE NIPIGON AREA

On November 16, 2001, Valerie Gold Resources Ltd. optioned a new palladium-platinum occurrence located northwest of Armstrong, that was discovered as a direct result of prospecting follow-up of a lake sediment anomaly identified in OFR 6027, *Armstrong–Lake Nipigon Area Lake Sediment Survey: Operation Treasure Hunt—Area C* (Ontario Geological Survey 2000a). Following the release of OFR 6027 by the OGS in 2000, a consortium of R. Koivisto, Elgin Lake Mines Limited, K. Kukkee and R. Tweedie staked a number of priority "selected anomalous areas" as identified in the report summary. Lake sediment anomalies included Area No. 5 and point sample site 2298, illustrated as anomalous in palladium, platinum, copper, nickel and gold. Values of 35.9 ppb Pd were returned from lake sediments in a small north-trending narrow lake located 9.5 km west-northwest of Armstrong and immediately south of Caribou Lake. By late 2001, 12 claims, totaling 186 units, were staked by the consortium.

During the 2001 field season, R. Koivisto and partners prospected bedrock in the vicinity of sample site 2298 and other areas with anomalous palladium, platinum, copper and/or nickel values. On the eastern side of the unnamed lake at sample location 2298, a new bedrock palladium discovery was made. Combined palladium-platinum-gold values up to 750 ppb were returned from ten grab samples, along 300 m of the eastern shoreline (R. Koivisto and K. Kukkee, Prospectors, personal communication, 2002). Local coarse-grained diabase to medium-grained and pegmatitic gabbro are presumably Mesoproterozoic, part of the northern portion of the Nipigon Basin. Chalcopyrite- and pyrite-bearing gabbroic rocks intrude Neoarchean metasedimentary rocks of the Wabigoon Subprovince. The property is partially coincident with a magnetic and gravity anomaly.

Valerie Gold Resources Ltd., following an option agreement with the vendors, has commenced line cutting and geophysical surveys on the new PGE occurrence that was discovered as a direct result of the Armstrong–Lake Nipigon Area Lake Sediment Survey (OFR 6027) and follow-up prospecting.

A second palladium discovery on Little Caribou Lake, 10 km northeast of the new discovery, returned 484 ppb Pd (K. Kukkee, Prospector, personal communication, 2002).

Operation Treasure Hunt—Lake Sediment Surveys 2001

Two lake sediment geochemical surveys were released in the Thunder Bay North District in 2001. Open File Report 6071 (Miscellaneous Release—Data 89) (Ontario Geological Survey 2001a, 2001d), covering the Fort Hope area, was released on December 6, 2001; all of this survey is within Thunder Bay North District. Open File Report 6069 (Miscellaneous Release—Data 88) (Ontario Geological Survey 2001b, 2001c), covering the Sioux Lookout–Bamaji Lake area, was released on December 11, 2001; the northwest corner of Map 2 is relevant to the Thunder Bay North District. As the appendices to these reports list selected analyses and sites, exploration personnel are advised to purchase the digital data for a complete listing of the geochemical analyses.

FORT HOPE AREA

The Fort Hope Area High Density Regional Lake Sediment Geochemical Survey (Open File Report 6071; Ontario Geological Survey 2001a) comprised a total of 3694 sites that were analyzed for 60 elements by five analytical methods. These analyses resulted in the detection of 55 anomalous locations. Seven of these locations are highlighted below:

#1 Anomaly (Au)

This area of 3 elevated to highly anomalous sample sites is located 1 km west of Orrell Lake. There is no staking within 10 km of the anomalous sample sites (as of February 10, 2002). An oval, moderate-strength magnetic "high" (Ontario Department of Mines–Geological Survey of Canada 1960f), has been noted, just north of this area. Regional geologic mapping (Thurston et al. 1969) indicated an east-trending boundary between migmatite and granitic terrane just north of the area. Site 248 yielded the highest gold analysis in the Fort Hope survey.

Site	Au (ppb-INAA)
Threshold	4
246	6
248	47
251	20

#7 Anomaly (Cu, Co, Ni, Pd, Pt)

This elevated to highly anomalous sample site is located 6 km northwest of Stark Lake. There is no staking within 10 km of the anomalous sample site (as of February 10, 2002). There are no distinctive magnetic anomalies (Ontario Department of Mines–Geological Survey of Canada 1960f) in this area. Regional mapping (Thurston et al. 1969) indicated that the area is underlain by granitic to migmatitic rocks. Site 292 yielded the third-highest palladium analysis in the Fort Hope survey.

Site	Cu (ppm)	Co (ppm)	Ni (ppm)	Pt (ppb)	Pd (ppb)
Threshold	15.8	2.56	13.2	0.3	0.3
215	27.5	3.19	15.1	<0.5	<0.9
216	47.6	2.35	13.2	1.1	2.5
217	28.0	4.17	16.2	<0.5	<0.9
218	71.8	2.32	13.6	0.9	2.5
291	81.8	3.03	12.8	0.7	2.7
292	62.4	2.48	10.1	0.9	5.2

#8 Anomaly (Au, Cu, Co, Ni, Pt, Pd)

This area of 1 highly anomalous sample site is located 1 km north of Makokibatan Lake. There is no staking within 10 km of this highly anomalous sample site (as of February 10, 2002). Weak magnetic "highs" (Ontario Department of Mines–Geological Survey of Canada 1960g), just north of the anomalous sample site, may be significant to platinum group element exploration. Regional mapping (Thurston et al. 1969) indicated that the area is underlain by greywacke. Site 4024 yielded the highest palladium analysis in the Fort Hope survey.

Site	Au (ppb-FA)	Cu (ppm)	Co (ppm)	Ni (ppm)	Pt (ppb)	Pd (ppb)
Threshold	4	15.8	2.56	13.2	0.3	0.3
4024	8	17.5	4.17	21.2	3	7.4

#9 and #10 Anomaly (Cu, Co, Ni, Pd)

This area of 5 elevated to highly anomalous sample sites is located 3 km southwest of Hector Lake. There is no staking within 10 km of the anomalous sample sites (as of February 10, 2002). A series of 3 elongate northeast-trending magnetic "highs" (Ontario Department of Mines–Geological Survey of Canada 1960e) in the area of the anomalous sample sites are illustrated (Figure 4). Regional mapping (Thurston et al. 1969) indicated that mafic metavolcanic rocks underlie the area. Site 435 yielded the second highest palladium analysis in the Fort Hope survey.

Site	Cu (ppm)	Co (ppm)	Ni (ppm)	Pd (ppb)
Threshold	15.8	2.56	13.2	0.3
435	44.3	1.76	22.3	6.4
441	119.0	1.06	12.1	2.4
442	48.4	1.56	11.4	1.9
448	22.7	4.6	19.2	<0.9
449	22.4	3.9	15.8	<0.9

#22 Anomaly (Au, Cu, Ni, Pt, Pd, ±Cr, ±Zn, ± Pb, ±Co, ±Cd)

This elevated to highly anomalous sample site is located 2 km northeast of Luther Lake. There is no staking within 10 km of the anomalous sample site (as of February 10, 2002). A weak magnetic "high" (Ontario Department of Mines–Geological Survey of Canada 1960b) is located just north of the area. Regional mapping Thurston et al. 1969) indicated that the area is near the contact between mafic metavolcanic and granitic rocks. Site 3955 was anomalous in more elements than any other site in the Fort Hope survey. However, its proximity to an esker may suggest that the values do not reflect a local bedrock source.

Site	Au (ppb-FA)	Au (ppb-INAA)	Cu (ppm)	Ni (ppm)	Pt (ppb)	Pd (ppb)
Threshold	4	4	15.8	13.2	0.3	0.3
3955	6	11	50.1	20.7	2.6	1.4

#28 Anomaly (Cu, Co, Ni, Pt, Pd)

This area of 2 elevated to highly anomalous sample sites is located 2 km northeast of Miska Lake. There is no staking within 10 km of anomalous sample sites (as of February 10, 2002). An oval, moderate magnetic "high" (Ontario Department of Mines–Geological Survey of Canada 1960d) just north of the anomalous sample sites has been noted. Regional mapping (Thurston et al. 1969) indicated that the area is underlain by mafic metavolcanic and mafic intrusive rocks.

Site	Cu (ppm)	Co (ppm)	Ni (ppm)	Pt (ppb)	Pd (ppb)
Threshold	15.8	2.56	13.2	0.3	0.3
1214	106.0	4.78	31.7	0.6	2
1215	47.7	6.58	22.9	<0.6	1.1

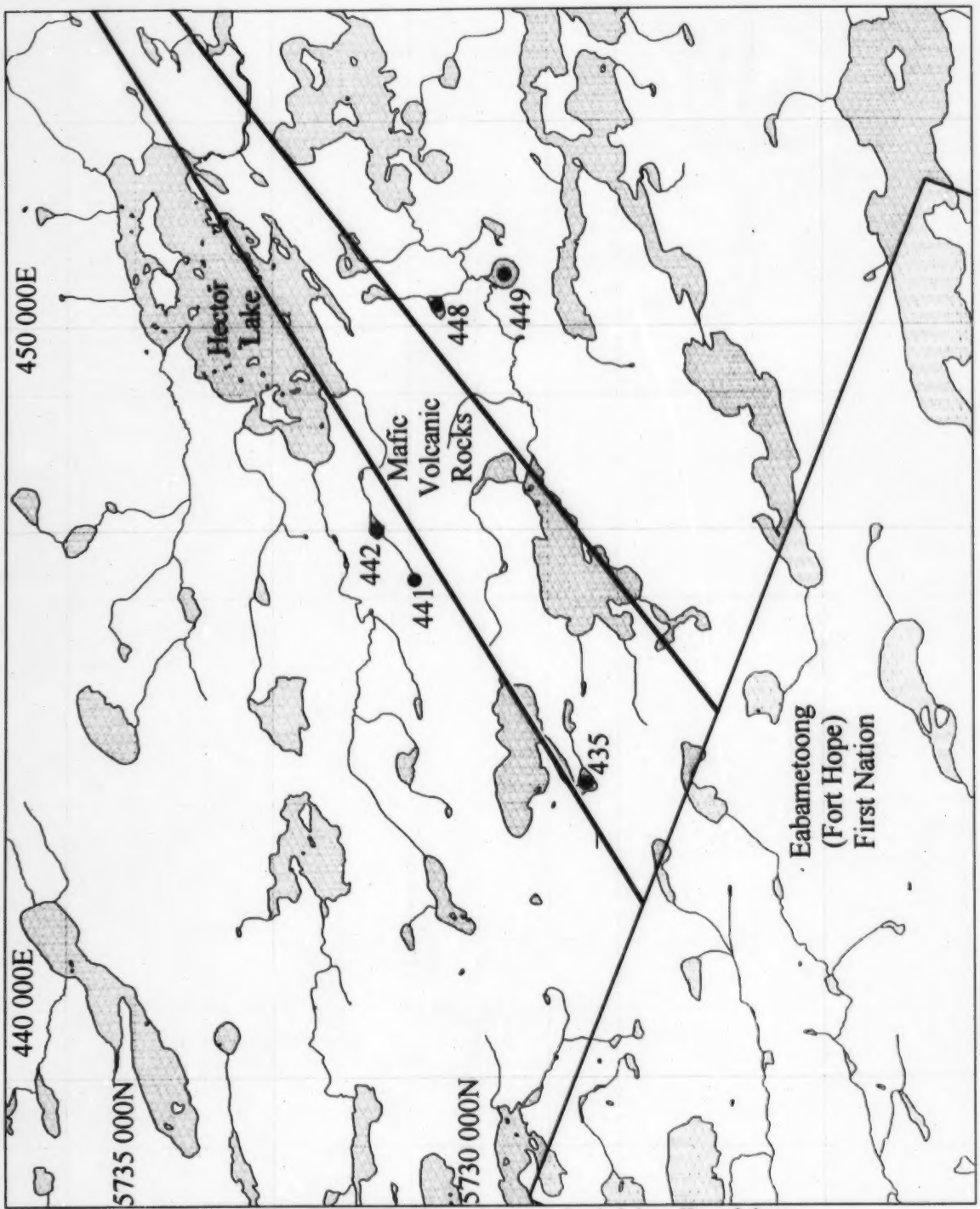


Figure 4. *Operation Treasure Hunt*, lake sediment geochemical sites—Hector Lake area.

Opikeigen Lake (Cu, Pb, Zn)

This area of 3 elevated to highly anomalous sample sites is located 3 km northwest of Opikeigen Lake (Figure 5). There are no claims within at least 10 km of the anomalous sample sites (February 10, 2002). Strong magnetic "highs" indicated on map 964G (Ontario Department of Mines–Geological Survey of Canada 1960c), just south of the area, may be significant, potentially indicating lithologies that could host base metal mineralization. Regional mapping (Thurston et al. 1969) indicated that the area is underlain by mafic to intermediate metavolcanic rocks.

Site	Cu (ppm)	Pb (ppm)	Zn (ppm)
threshold	15.8	2.95	92
3213	36.9	3.02	148
3214	20.5	4.15	111
3216	24.4	3.15	102

SIOUX LOOKOUT–BAMAJI LAKE AREA

The Sioux Lookout–Bamaji Lake Area Lake Sediment Survey (OFR 6069; Ontario Geological Survey 2001b) comprised a total of 2163 sites that were analyzed for 57 elements by 5 analytical methods. These analyses resulted in the detection of 20 anomalous locations. Four of these locations which are relevant to Thunder Bay North District are highlighted below:

Upper Kaginot Lake (Cu, Zn, Ag, ±Pb)

This area of 5 elevated to anomalous sample sites is located 2 km north of Upper Kaginot Lake (Figure 6). There is no staking within 3 km of the anomalous sample sites (as of February 10, 2002). A magnetic "high" (Ontario Division of Mines 1976a) that may represent a bedrock source of massive sulphide mineralization, is located just to the east of this area. The regional geologic mapping (Sage et al. 1972) indicated that the area is underlain by gneissic granodiorite, but the area has not been mapped in detail.

Site	Cu (ppm)	Pb (ppm)	Zn (ppm)	Ag (ppm)
Threshold	23	4.72	76	0.16
2153	33	2.54	44	0.11
2155	33	3.36	111	0.04
2156	32	4.68	77	0.13
2158	50	3.07	128	0.10
2159	29	4.34	65	0.35

Bamaji Lake (REE, Fe, Pb, Cr, Ni)

This area of 3 elevated to highly anomalous sample sites is located in the southwestern arm of Bamaji Lake (Figure 7). There is no staking within 10 km of the anomalous sample sites (as of February 10, 2002). A series of northwest-trending, moderate-strength magnetic "highs" (Ontario Division of Mines 1976b) are located in this area. Proximity to a northeast-trending regional structure near the Uchi and English River subprovince boundary may be significant to rare earth element mineral exploration (Breaks et al. 2001). The regional geologic mapping (Sage et al. 1972) determined that granitic rocks underlie the area.

Site	REE (ppm)	Fe (ppm)	Pb (ppm)	Cr (ppm)	Ni (ppm)
Threshold	121	14514	4.72	25	22
2177	201	36858	5.35	32	23
2179	289	90654	7.06	35	31
2182	178	32496	9.70	33	22

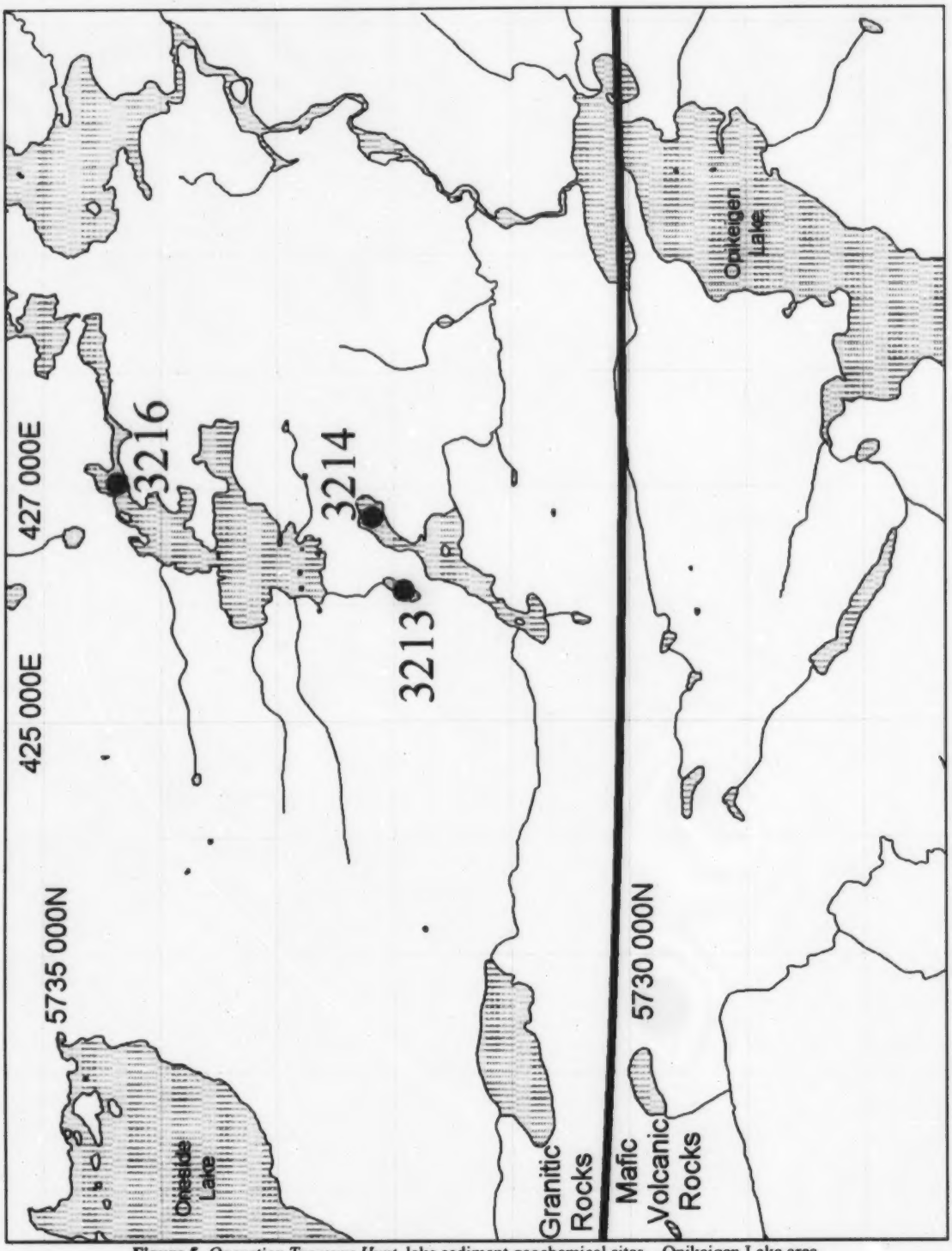


Figure 5. *Operation Treasure Hunt*, lake sediment geochemical sites—Opikeigen Lake area.

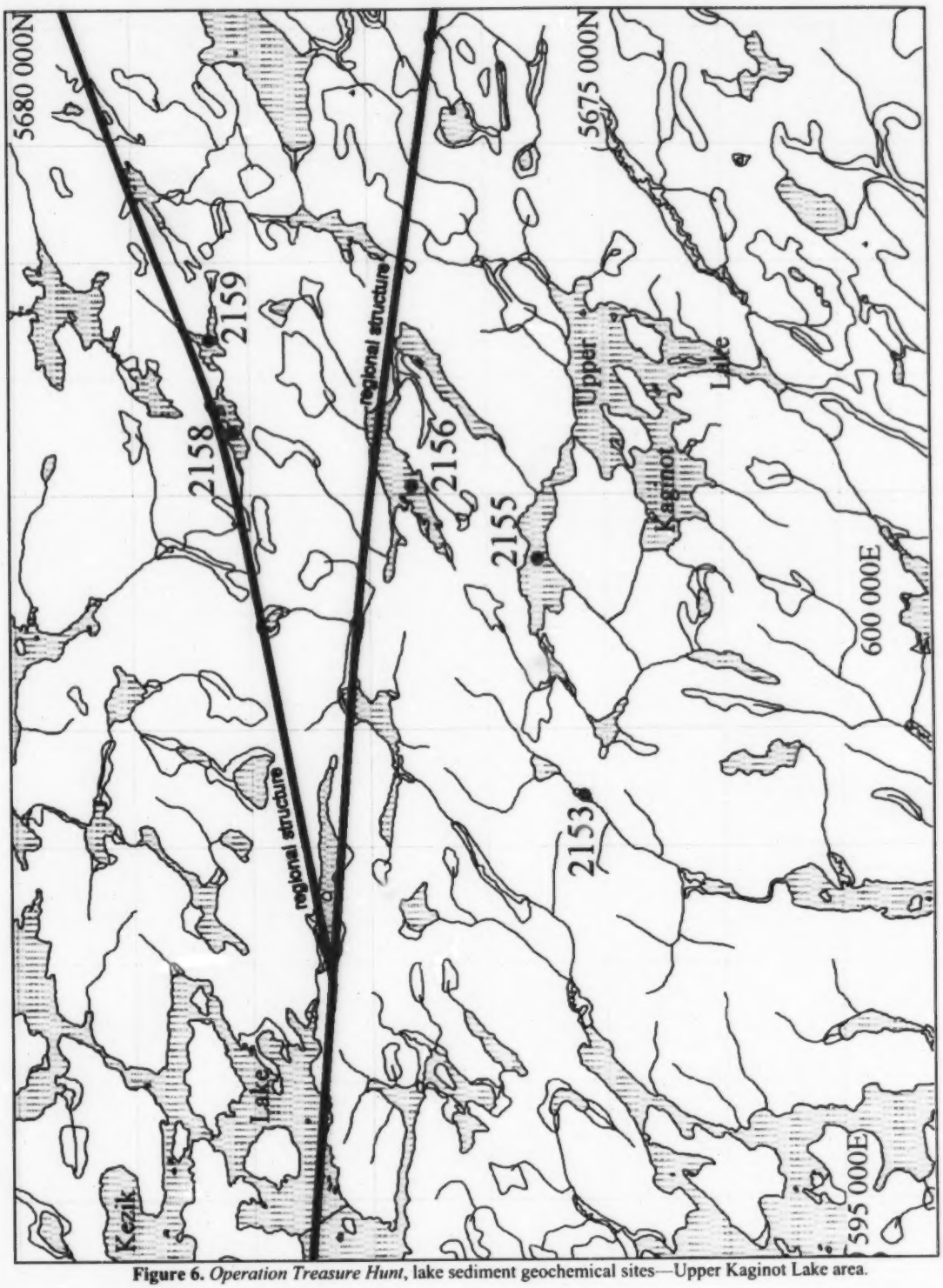


Figure 6. *Operation Treasure Hunt*, lake sediment geochemical sites—Upper Kaginot Lake area.

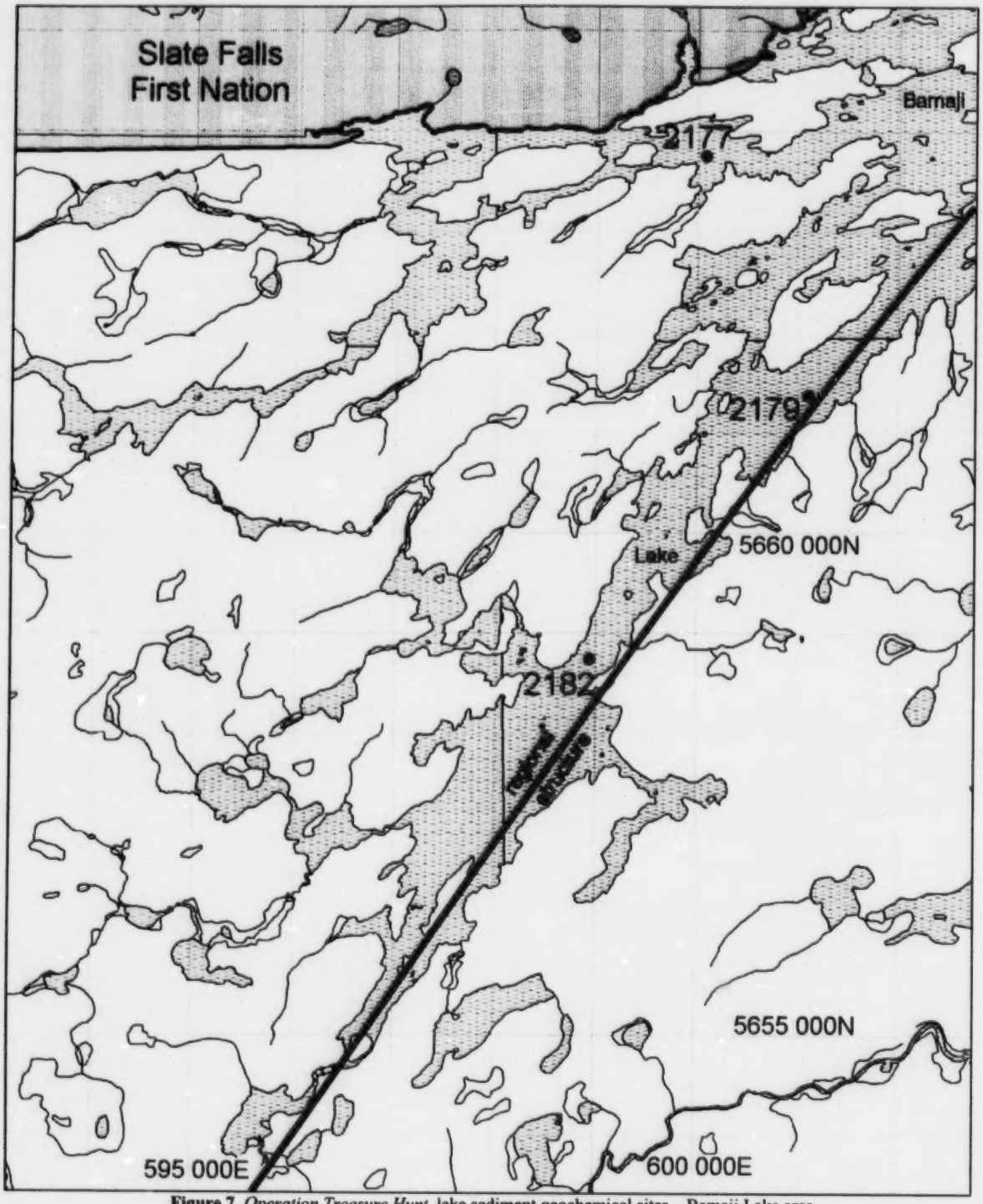


Figure 7. *Operation Treasure Hunt,* lake sediment geochemical sites—Bamaji Lake area.

Root Lake East (Cu, Ni, Pt, Pd)

This area of 4 elevated to highly anomalous sample sites is located 8 km northeast of Root Lake. There is no staking within 7 km of the anomalous sample sites (as of February 10, 2002). A series of east-trending, elongate, very strong magnetic "highs" (Ontario Department of Mines–Geological Survey of Canada 1960a) is located in this area. The regional geologic mapping (Breaks et al. 1979) indicated that mafic metavolcanic rocks and migmatite lie to the north and south of the subprovince boundary, respectively.

Site	Cu (ppm)	Ni (ppm)	Pt (ppb)	Pd (ppb)
Threshold	23	22	0.7	1.2
2241	74	17	1.8	2.8
2242	26	10	1.9	1.6
2243	30	26	0.9	<0.9
2244	31	41	0.5	<0.9

Root Lake South (Cu, Ni, Pt, Pd)

This area of 4 elevated to highly anomalous sample sites is located 7 km southeast of Root Lake. There is no staking within 6 km of the anomalous sample sites (as of February 10, 2002). A series of east-trending, elongate, moderate-strength, paired magnetic "high/lows" (Ontario Department of Mines–Geological Survey of Canada 1960a) is located in this area. The regional geologic mapping (Breaks et al. 1979) delineated a boundary between monzonite and migmatite. Local timber roads will assist access to this area.

Site	Cu (ppm)	Ni (ppm)	Pt (ppb)	Pd (ppb)
threshold	23	22	0.7	1.2
2246	18	10	<0.5	1.9
2247	32	15	1.1	3.8
2248	81	26	1.7	5.3
2249	42	23	0.8	3.4

Operation Treasure Hunt—Airborne Geophysical Surveys

The Fort Hope geophysical survey will be released in 2002 and will represent the largest airborne geophysical program flown under *Operation Treasure Hunt* (Figure 8).

At least one area, which was recommended for exploration in Report of Activities, 2000 (Mason et al. 2001, p.40) remains unstaked. The Vickers area *Operation Treasure Hunt* airborne magnetic data clearly outline 3 discrete magnetic portions in the mafic intrusion centred on Otoskwin Lake. As well, a northwest-trending feeder dike is apparent on these airborne magnetic maps (Ontario Geological Survey 2000b). This magnetic expression and the fact that the area is underlain by gabbroic and anorthositic rocks (Fenwick 1971) implies that the area is prospective for PGE mineralization (Figure 9). As this area is in close proximity to the boundary of the Windigo Tribal Council Planning Board, notification of mineral exploration activities would be required.

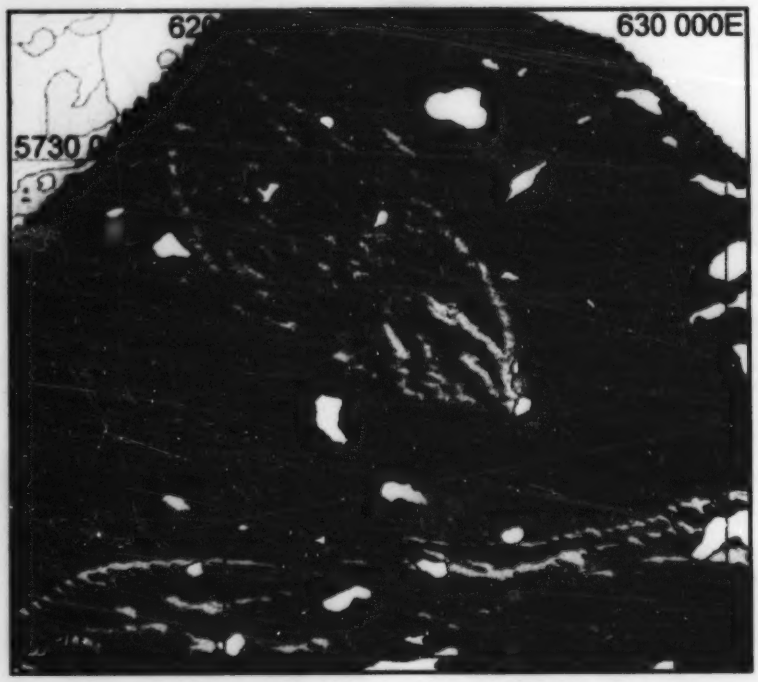
Tantalum

There are several locations that are prospective for tantalum mineralization within the Thunder Bay North District. Mineral exploration is recommended near known lithium-bearing pegmatites (e.g., Lilypad Lakes, Linklater Lake, Zigzag Lake and Georgia Lake areas). In particular, the boundary zone between Campbell Lake and Falcon Lake warrants reconnaissance prospecting for potential tantalum-bearing pegmatites. This 80 km portion of the Wabigoon and English River Subprovince boundary is host to at least seven lithium occurrences (Pye et al. 1966). Furthermore, north-trending structures off of this zone host at least 10 lithium occurrences. The English River and Uchi Subprovince boundary from Otatakan Lake to Greenbush Lake is also prospective for tantalum-bearing pegmatites. Map 2442 (Breaks et al. 1979) illustrates at least 18 tourmaline ± lithium occurrences along this 135 km trend. Although there has been claim staking west of Cosgrave Lake and southwest of Georgia Lake, large

Figure 8. *Operation Treasure Hunt*, airborne geophysical survey—Fort Hope area.

Geology after Map 2218

1 mafic volcanic rocks
3 sedimentary rocks
4 gabbro
7 granodiorite



Airborne Magnetic data after Map 82145

Figure 9. *Operation Treasure Hunt*, airborne geophysical survey—Otoskwin Lake area. Top figure *after* Sage et al (1972); bottom figure *after* Ontario Geological Survey (2000b).

areas with prospective tantalum-bearing pegmatites remain unstaked south of Palace Lake, east of Georgia Lake and around all of Barbara Lake. All 33 lithium-bearing pegmatite deposits in the Thunder Bay districts that are listed in Table 21 of Hewitt (1967) as well as the 4 lithium-columbium occurrences listed on page 53 of Ferguson (1971) in the Georgia Lake area should be investigated for their tantalum, cesium and rubidium potential.

Base Metals and Gold

BEARDMORE–GERALDTON AREA

Felsic metavolcanic terrains in the Onaman–Tashota metavolcanic belt should be re-examined for volcanogenic massive sulphides (VMS), especially in the following areas: Marshall–Toronto lakes, Metcalfe–Oboshkegan lakes, Melchett–Colpitts lakes, Elmhirst–Rickaby–Lapierre townships and O'Sullivan–Muriel lakes. Stratigraphy should be carefully mapped to delineate interflow marker horizons. Rocks should be prospected for sulphides. Units immediately above and below interflow metasedimentary units may host VMS-related alteration and mineralization. Felsic intrusions should be re-examined to determine if they are subvolcanic (hypabyssal intrusions).

A re-evaluation of the OGS–Aerodat airborne geophysical survey (Ontario Geological Survey 1989) is recommended for generating potential VMS targets.

Gold exploration is recommended on the central and eastern extensions of the Paint Lake–Burrows River fault, a transcurrent fault associated with gold deposits in the western end of the belt. The fault has been intersected in areas of extensive overburden, but little mineralization has been encountered to date. Further detailed prospecting for gold is recommended between Geraldton and the Kinghorn Road on the Paint Lake–Burrows River fault and along secondary/tertiary faults and/or lineaments.

Feldspar porphyry and porphyritic gabbro intrusions should be prospected for along fault zones and/or lineaments. Gold can be associated with pyrite and/or arsenopyrite mineralization. Sulphide minerals are disseminated or may occur in quartz-sericite-carbonate veins and/or stockwork zones within the intrusions or at contacts with metasedimentary and metavolcanic country rocks.

FORT HOPE AREA

The Fort Hope area is within the eastern portion of the Uchi Subprovince and hosts a tabular east-trending belt (080°) of metavolcanic and metasedimentary rocks forming a semi-continuous sequence of supracrustal rocks. The Uchi Subprovince extends for over 625 km and includes such prolific gold-producing camps as Red Lake and Pickle Lake. Production from the Uchi Subprovince exceeds 23 million ounces of gold. A re-evaluation of gold mineralization in the Fort Hope area is recommended.

Gold Deposits

Gold deposit types in the Fort Hope area have been subdivided as follows (Mason and White 1995):

1. Quartz veins in mafic metavolcanic rocks ± porphyry (e.g., Fort Hope gold mine; Currie, Hansen gold occurrence, Pioneer Lake and Schist Lake occurrences);

2. Quartz veins, silicification and carbonatization in clastic metasedimentary rocks (e.g., Szetu–Bayne occurrence);

3. Banded iron formation with arsenopyrite or pyrrhotite (e.g., Goss Lake prospect; Asarco and Wottam Lake occurrences);

4. Quartz veins + feldspar porphyry with antimony in mafic metavolcanic rocks (e.g., Howells Lake prospect);

5. Feldspar ± quartz porphyry with silicification ± shear zone (e.g., KL-12 zone, Talbot Lake gold prospect);

6. Quartz-tourmaline veins in wackes (e.g., North Wottam Lake occurrence);

7. Strongly foliated to sheared mafic to felsic metavolcanic rocks (e.g., OL12/OL29 zones, Zulapa prospect); and

8. Tungsten-bearing quartz veins ± intensely sheared mafic metavolcanic rocks hosting pyrite-pyrrhotite-magnetite (e.g., Reserve Creek and Rich Lake occurrences).

MEEN–DEMPSTER GREENSTONE BELT

The Meen–Dempster greenstone belt of the Uchi Subprovince warrants re-examination of gold mineralization targets. Past gold production and current gold resources occur in the Meen–Dempster belt. Seim (1993) described 5 principal types of gold deposits within the confines of the Meen–Dempster greenstone belt:

1) Gold-bearing quartz veins occurring in discrete shear zones (e.g. Golden Patricia Vein, Tonsil zone, Koromond occurrence, Flicka occurrence).

2) Gold-bearing quartz veins filling tension-induced fractures (e.g. Sudbury Point occurrence, South Dunlop Lake occurrence).

3) Shear zone-hosted areas of silicification and/or sericitization and/or carbonatization and/or sulphidization (e.g. Dobie River zone, Umex–Dorothy Lake, Koval–Ohman).

4) Gold-bearing sulphide replacement zones within iron formation and ferruginous metasediments (e.g. Kasagiminnis Lake deposit, McVean Lake occurrence, Esker zone, Powerline zone, B-zone).

5) Gold-uranium mineralization in the sheared contact between the metavolcanics [*sic*] and the North Bamaji Pluton (e.g. Kirkland Townsite Showing #1).

Many of the gold occurrences described in this report include mineralization that can be placed into one or more of the above deposit sites. For many others, the geological information available is not sufficient to classify the deposit type.

A common feature of the majority of the gold occurrences in the Meen–Dempster greenstone belt is their association with highly sheared and deformed rocks. These highly deformed rocks may be parts of a belt-wide set of deformation zones as suggested above. Andrews et al. (1986) suggested that, in the Red Lake greenstone belt, the gold deposits are essentially products of hydrothermal fluids introduced into ductile deformation zones at a late stage in the tectonic history of the belt and at about the time of plutonic emplacements. This may also be the case on the Meen–Dempster greenstone belt. Stott and Wallace (1984) and Stott and Corfu (1991) suggest that the deformation zones in the Meen–Dempster greenstone belt were active at different points late in the tectonic history of the belt and at about the time of the emplacement of some of the internal plutons. Thus, it is suggested that the role of the deformation zones in the Meen–Dempster greenstone belt, with respect to gold mineralization, may have been similar to that of the deformation zones in the Red Lake greenstone belt.

OGS ACTIVITES AND RESEARCH BY OTHERS

J.C. DeWolfe, B. Lafrance (Laurentian University, Sudbury, Ontario) and G.M. Stott (Precambrian Geoscience Section, OGS) completed a structural investigation of mesothermal gold mineralization in the Beardmore–Geraldton terrane (DeWolfe et al. 2001).

K.H. Straub completed a geochemical study of hydrothermal alteration relative to VMS base metal mineralization in the Marshall Lake area, on the northern margin of the Onaman–Tashota greenstone belt.

G. Stott and G. Johns (Precambrian Geoscience Section, OGS) continued with the bedrock map compilation project, northwestern Ontario.

J.A. Percival (Geological Survey of Canada) and M.D. Young (MSc candidate, Queen's University, Kingston, Ontario) continued with a lithotectonic study in the Pickle Lake greenstone belt. The study is a portion of the NATMAP Western Superior Crustal Evolution study.

ACKNOWLEDGEMENTS

J. Mason and M. Smyk edited the manuscript. Prospectors and company personnel are thanked for their contributions.

Table 5. Mineral deposits not being mined in the Thunder Bay North District in 2001.

Abbreviations

AF.....Assessment Files
CMH.....Canadian Mines Handbook
GR.....Geological Report
MDC.....Mineral Deposit Circular
MDIR.....Mineral Deposit Inventory record
MLS.....Mining Lands, Sudbury
MR.....Mining Recorder
NM.....The Northern Miner
OFR.....Open File Report
PC.....Personal Communication

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Arseno Lake (53B14/NE)	Zn, Pb, Cu, Ag	1 million t @ 8.7% comb. Zn-Pb, 1.5 opt Ag	Energold Minerals Inc./Northern Dynasty Minerals Ltd.	1988 Annual Report Northern Dynasty Explorations Ltd.	Inactive
Big Trout Lake (53H12/SW)	Pt, Pd, Cr	Not available	Platinex Inc.	AF	
Brookbank (42E12/NW)	Au	1.463 million t @ 6.4 g/t Au inferred (2.0 g/t Au cutoff)	Ontex Resources Ltd.	BCE Emergis E-News Services 2001-03-08	New Reserves
Dobie Zone (52O06/NE)	Au	301 000 t @ 5.5 g/t Au		MDIR KP1082	Inactive
Goss Lake (52P09/SW)	Au	300 000 t @ 0.23 opt Au to 60 m depth	Ayrex Resources Ltd./Tandem Resources Ltd.	CMH 1995-96, p.50	Last active 1988.
Headway Coulee (42L04/SE)	Zn, Ag	250 000 t @ 4.44% Zn, 1.32 opt Ag	N. Cox, M. Holt	OFR 5630, p.41	Diamond drilling and stripping – Big Mac zone 1995. Geophysics 1997.
Howells Lake (52P10/SW)	Au	83 000 t @ 0.07 opt Au (+1.37% antimony) and 660 000 t (+3.1% antimony) with erratic Au values	Homestake Canada Inc.	OFR 5926, p.68	Last active in 1988.
Jacobus (42E13/SE)	Cu, Ni	1 million t @ 0.94% Cu-Ni	NWT Copper Mines Limited	CMH 1995-96, p.275	Most recent work diamond drilling by SEG in 1993. Deposit open down plunge.

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Juneau Lake (42L05/SW)	Ni, Cu, PGE	2.2 million t @ 0.87% Ni, 0.59% Cu	Landore Resources Inc.–Brancote	OFR 5630, p.41	Diamond drilling 2001.
Karl–Zeemel (53B09/SW)	Au	327 000 t @ 4.6 g/t Au	Barrick Gold Corp./Placer Dome North American Ltd.	NM Jan. 8, 1996, p.15	
Kasagiminnis Lake (52O08/SW)	Au	284 000 t @ 5.8 g/t Au	Greenshields Resources Inc.	MDIR KP1129	Inactive
Koval–Ohman (52O07/SE)	Au	471 589 t @ 5.81 g/t Au	Barrick Gold Corp.	MDIR KP0243	Inactive
Lavoie Lake (43D05/NE)	Cu, Ni	14.6 million t @ 0.58% Cu, 0.37% Ni	PGM Ventures Inc.	OFR 5926, p.101	Last active 1992. Compilation 1995. Recent acquisition.
Lynx Canada (42L04/SE)	Cu, Ag	25 000 t @ 4.0% Cu, 300 000 t @ 2.0% Cu, 1.0 opt Ag	N. Cox, M. Holt	OFR 5630, p.41	Diamond drilling and stripping – Big Mac zone 1995.
Magnet Consolidated Mine (42E11/NE)	Au	150 700 t @ 0.38 opt Au, 1 082 340 t @ 0.34 opt Au	Roxmark Mines Limited/Beaurox Mines	CMH 1995–96, p.330	U/G development in 1982–87.
Marshall Lake (42L05/NE)	Cu, Zn, Ag, Au	1.22 million t @ 3.2% Zn, 0.94% Cu, 2.2 opt Ag	Giant Gripp Mines	CMH 1995–96, p.275	Diamond drilling 1996–97. Reinterpretation 1997, 2000.
Norton Lake (42M14/NW)	Ni, Cu	1.0 million t @ 0.72% Ni, 0.56% Cu	East West Resources Ltd.	OFR 5926, p.136	MMI geochem. survey, core reassaying.
Paulpic (42L04/NE)	Au	200 000 t @ 0.231 opt Au	Canada Tungsten Inc.	OFR 5630, p.465	Last active 1987.
Pickle Crow Gold Mine (52O09/SE)	Au	1 395 700 t @ 0.186 opt Au (diluted)	Cantera Mining Ltd./Wolfden Resource Inc./Jonpol Explorations Ltd.	MDIR KP0255	9160 t bulk sample #5 vein.
Thierry Mine (52O08/NW)	Cu, Ni	7 million t @ 1.88% Cu, 0.23% Ni	PGM Ventures Inc.	MDIR KP0247	Compilation and preliminary sampling 2001.
Umex–Dorothy Lake (52O06/NW)	Au	236 220 t @ 6.17 g/t Au	Major General Resources Ltd.	MDIR KP1072	Inactive
Zulapa (42M12/SW)	Au	700 000 t @ 0.28 opt Au to 200 m deep	Eabametoong First Nation	OFR 5926, p.208	

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Metric Conversion Table

Conversion from SI to Imperial			Conversion from Imperial to SI		
SI Unit	*Multiplied by*	*Gives*	*Imperial Unit*	*Multiplied by*	*Gives*
		LENGTH			
1 mm	0.039 37	inches	1 inch	**25.4**	mm
1 cm	0.393 70	inches	1 inch	**2.54**	cm
1 m	3.280 84	feet	1 foot	**0.304 8**	m
1 m	0.049 709	chains	1 chain	20.116 8	m
1 km	0.621 371	miles (statute)	1 mile (statute)	**1.609 344**	km
		AREA			
1 cm^2	0.155 0	square inches	1 square inch	**6.451 6**	cm^2
1 m^2	10.763 9	square feet	1 square foot	**0.092 903 04**	m^2
1 km^2	0.386 10	square miles	1 square mile	2.589 988	km^2
1 ha	2.471 054	acres	1 acre	0.404 685 6	ha
		VOLUME			
1 cm^3	0.061 023	cubic inches	1 cubic inch	**16.387 064**	cm^3
1 m^3	35.314 7	cubic feet	1 cubic foot	0.028 316 85	m^3
1 m^3	1.307 951	cubic yards	1 cubic yard	0.764 554 86	m^3
		CAPACITY			
1 L	1.759 755	pints	1 pint	0.568 261	L
1 L	0.879 877	quarts	1 quart	1.136 522	L
1 L	0.219 969	gallons	1 gallon	**4.546 090**	L
		MASS			
1 g	0.035 273 962	ounces (avdp)	1 ounce (avdp)	28.349 523	g
1 g	0.032 150 747	ounces (troy)	1 ounce (troy)	**31.103 476 8**	g
1 kg	2.204 622 6	pounds (avdp)	1 pound (avdp)	**0.453 592 37**	kg
1 kg	0.001 102 3	tons (short)	1 ton (short)	**907.184 74**	kg
1 t	1.102 311 3	tons (short)	1 ton (short)	**0.907 184 74**	t
1 kg	0.000 984 21	tons (long)	1 ton (long)	**1016.046 908 8**	kg
1 t	0.984 206 5	tons (long)	1 ton (long)	**1.016 046 90**	t
		CONCENTRATION			
1 g/t	0.029 166 6	ounce (troy)/ ton (short)	1 ounce (troy)/ ton (short)	34.285 714 2	g/t
1 g/t	0.583 333 33	pennyweights/ ton (short)	1 pennyweight/ ton (short)	1.714 285 7	g/t

OTHER USEFUL CONVERSION FACTORS

	Multiplied by	
1 ounce (troy) per ton (short)	31.103 477	grams per ton (short)
1 gram per ton (short)	0.032 151	ounces (troy) per ton (short)
1 ounce (troy) per ton (short)	20.0	pennyweights per ton (short)
1 pennyweight per ton (short)	0.05	ounces (troy) per ton (short)

Note: Conversion factors which are in bold type are exact. The conversion factors have been taken from or have been derived from factors given in the Metric Practice Guide for the Canadian Mining and Metallurgical Industries, published by the Mining Association of Canada in co-operation with the Coal Association of Canada.